

2004 Model Year Police Vehicle Evaluation



State of Michigan
Department of State Police
Department of Management and Budget



National Law Enforcement and
Corrections Technology Center
*A Program of the National
Institute of Justice*

**STATE OF MICHIGAN
Department of State Police
and
Department of Management and Budget**

**2004 Model Year
Police Vehicle
Evaluation Program**

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PREFACE

The Michigan State Police Vehicle Test Team is pleased to announce the results of the 2004 model year Police Vehicle Evaluation. This year nine vehicles were tested including one non-published vehicle.

Saturday we enjoyed warm temperatures and bright blue skies at DaimlerChrysler Proving Grounds. Grattan Raceway, our vehicle dynamics test site, was a total washout on Monday due to rain. We came back Tuesday as scheduled, but the track was still wet with standing water in some areas. We sent out our practice cars and dried the track in 3 hours, which allowed us to complete testing by mid afternoon Tuesday. We appreciate your continued support and encouragement. The vehicles evaluated this year included:

POLICE CATEGORY

Chevrolet Impala 9C1	3.8L SPFI
Dodge Intrepid	3.5LSPFI
Ford Police Interceptor (3.27:1)	4.6L SPFI
Ford Police Interceptor (3.55:1)	4.6L SPFI

SPECIAL SERVICE CATEGORY

Ford Explorer*	4.6L SFI	(2 Wheel Drive)
Ford Expedition*	5.4L SMFI	(4 Wheel Drive)
Chevrolet Tahoe*	5.3L SPFI	(2 Wheel Drive)
Chevrolet Tahoe*	5.3L SPFI	(4 Wheel Drive)

****Special Service Package vehicles are not suitable for high speed, pursuit or emergency driving. (According to the manufacturers).***

NON-PUBLISHED VEHICLES (PROTOTYPES)

2005 Chevrolet Police Tahoe

**Any test data concerning the non-published vehicle is available from the manufacturer only.*

GENERAL INFORMATION

All of the vehicles were tested with a clean roof (no overhead light or lightbar) and without "A" pillar mount spotlights. We believe this is the best way to ensure all of the cars are tested on an equal basis. Remember that once overhead lights, spotlights, radio antennas, sirens, and other emergency equipment are installed, overall performance may be somewhat lower than we report.

Each vehicle was tested with the tires that are available as original equipment on the production model. Specific tire information for each vehicle is available in the Vehicle Description portion of this report.

DaimlerChrysler Proving Grounds - Acceleration, Top Speed, & Braking Tests

All vehicles listed in this report were equipped with electronic speed limiters.

Grattan Raceway - Vehicle Dynamics (High Speed Handling) Test

Prior to testing we were approached by Ford Motor Company, asking if they could remove an underbody air deflector behind the front bumper fascia. The deflector is forward of each front wheel and is mounted parallel to the pavement. Ford advised that this deflector is not on the 2004 model year car and should have been removed prior to delivery. We had a technician from Vehicle and Travel Services assist and monitor the removal of this part.

*The Chevrolet Tahoes, Ford Explorer, and Ford Expedition are "special service" vehicles and are not driven through the vehicle dynamics (high-speed handling) test. These vehicles are not recommended for high-speed emergency driving or pursuit applications.

We recommend you review the information contained in this report and then apply it to the needs of your agency. This report is not an endorsement of products, but a means of learning what's available for your officers so they can do their job effectively and safely. If anything in this report requires further explanation or clarification, please call or write.

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ACKNOWLEDGEMENTS

We would like to thank the following contributors. We are grateful for their support and encouragement toward our ultimate goal: a safe, successful testing program that benefits the law enforcement community nationwide and beyond.

Colonel Tadarial J. Sturdivant, Director, Michigan Department of State Police
Lt. Colonel Peter C. Munoz, Deputy Director, Uniform Services Bureau
Personnel from the Michigan Department of Management & Budget, Vehicle and Travel Services

The National Institute of Justice, The National Law Enforcement and Corrections Technology Center, Mr. Lance Miller, Mr. Alex Sundstrom, and Aspen Systems

Mr. Terry Packer and personnel from DaimlerChrysler Proving Grounds
Mr. Sam Faasen and personnel from Grattan Raceway Park

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Retired Sgt. Bill McFall



Special thanks to General Motors, Ford Motor Company, and DaimlerChrysler Motors vehicle manufacturers for their hard work in building and preparing the test cars. We are grateful for your dedication to law enforcement. Everyday law enforcement looks to these vehicles to do a list of duties varied and enduring.

Finally, thanks to all in the United States and Canada who represent law enforcement and purchasing agencies for your constant encouragement and support. We are proud to make a contribution to the law enforcement community.

Michigan State Police Vehicle Test Team

TEST EQUIPMENT

The following test equipment is utilized during the acceleration, top speed, braking, and vehicle dynamics portions of the evaluation program.

DATRON TECHNOLOGY, INC., 21654 Melrose Ave., Building 16, Southfield, Michigan 48075

DLS Smart Sensor – Optical non-contact speed and distance sensor

BELL HELMETS, Box 927, Rantol, Illinois 61866

Nascar Helmet – Model MC – 400

AMB i.t. US INC., 1631 Phoenix Blvd., Suite 11, College Park, GA 30349

AMB TranX extended loop decoder

Mains adapter 230 V AC/12 V DC

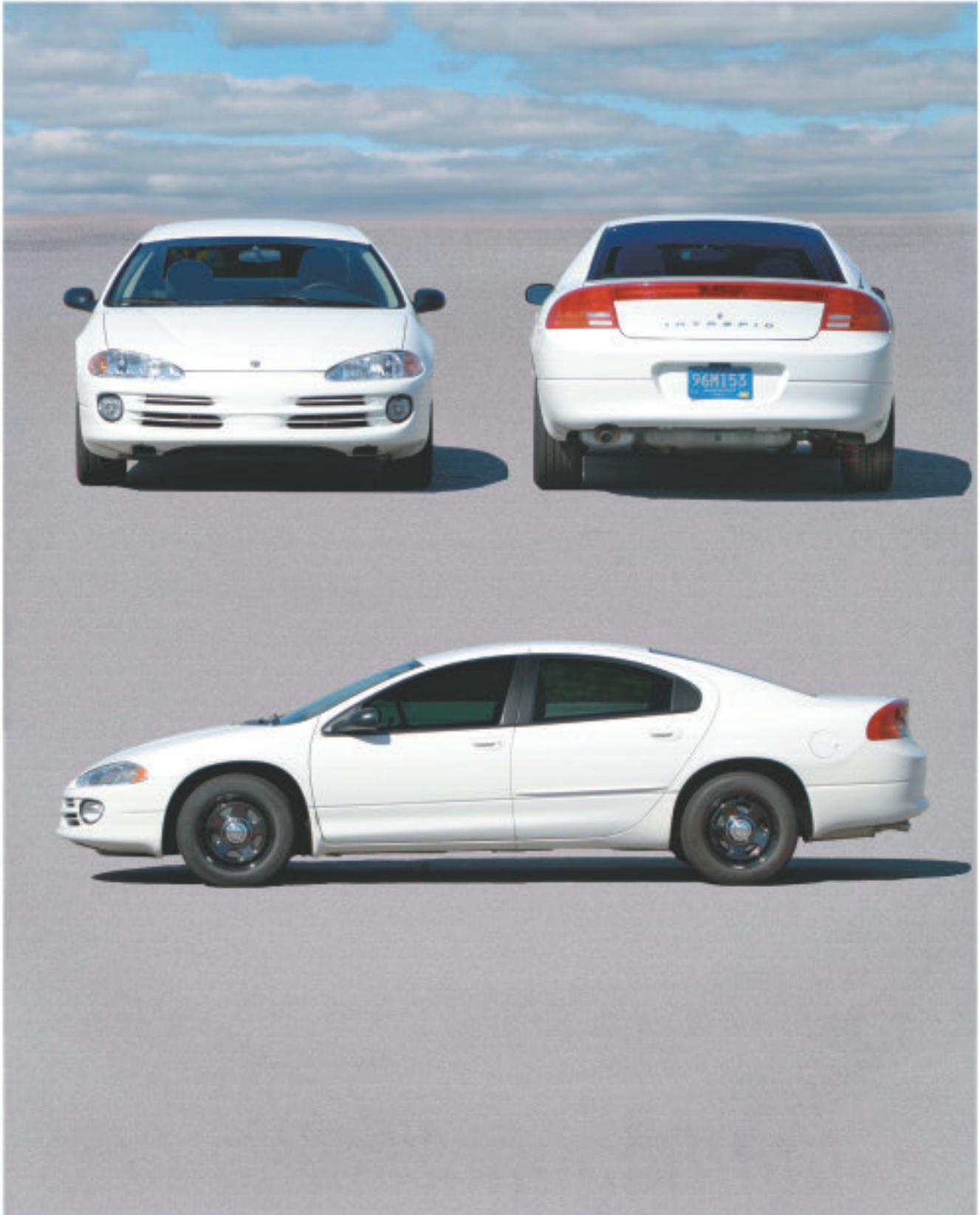
AMB TranX260 transponders

AMMCO TOOLS, Inc., 2100 Commonwealth Ave., North Chicago, IL 60064

Decelerometer, Model 7350

TEST VEHICLE DESCRIPTIONS AND PHOTOGRAPHS

**DODGE INTREPID
3.5L SPFI**



TEST VEHICLE DESCRIPTION

MAKE Dodge	MODEL Intrepid		SALES CODE NO. 25E	
ENGINE DISPLACEMENT	CUBIC INCHES 214		LITERS	3.5
FUEL SYSTEM	Sequential Port Fuel Injection		EXHAUST	Single
HORSEPOWER (SAENET)	242 @ 6400 RPM		ALTERNATOR	160 amp
TORQUE	248 lbs-ft		BATTERY	600 cca
COMPRESSION RATIO	9.9:1			
TRANSMISSION	MODEL 42LE	TYPE 4-Speed Electronic Automatic		
	LOCKUP TORQUE CONVERTER? Yes			
	OVERDRIVE? Yes			
AXLE RATIO	3.66:1			
STEERING	Power Rack & Pinion			
TURNING CIRCLE (CURB TO CURB)	37.6 ft			
TIRE SIZE, LOAD & SPEED RATING	P225/60R 16 97V Goodyear Eagle RS-A			
SUSPENSION TYPE (FRONT)	Independent Macpherson Strut, Coil Springs & Sway Bar			
SUSPENSION TYPE (REAR)	Independent Macpherson Strut, Coil Springs & Sway Bar			
GROUND CLEARANCE, MINIMUM	5.7 in	LOCATION Sway Bar		
BRAKE SYSTEM	Power, Single Piston, Anti-lock			
BRAKES, FRONT	TYPE	Vented Disc	SWEPT AREA 287.2 sq in	
BRAKES, REAR	TYPE	Solid Disc	SWEPT AREA 184.6 sq in	
FUEL CAPACITY	GALLONS	17.0	LITERS	64.4
GENERAL MEASUREMENTS	WHEELBASE	113.0	LENGTH	203.7
	TEST WEIGHT	3567 lbs	HEIGHT	55.9 in
HEADROOM	FRONT	38.3 in	REAR	37.5 in
LEGROOM	FRONT	42.2 in	REAR	39.1 in.
SHOULDER ROOM	FRONT	59.0 in	REAR	58.1 in
HIPROOM	FRONT	56.3 in	REAR	56.6 in
INTERIOR VOLUME	FRONT	55.0 cu ft	REAR	49.5 cu ft
	COMB	104.5 cu ft	TRUNK	18.4 cu ft
EPA MILEAGE EST. (MPG)	CITY 19	HIGHWAY 27	COMBINED 22	

FORD POLICE INTERCEPTOR
4.6L SPFI AXLE RATIO 3.27:1



TEST VEHICLE DESCRIPTION

MAKE Ford	MODEL Police Interceptor		SALES CODE NO. P71	
ENGINE DISPLACEMENT	CUBIC INCHES 281		LITERS	4.6
FUEL SYSTEM	Sequential Port Fuel Injection		EXHAUST	Dual
HORSEPOWER (SAENET)	250 @ 5000 RPM		ALTERNATOR	200
TORQUE	297 ft-lbs @ 4000 RPM		BATTERY	750 CCA
COMPRESSION RATIO	9.4:1			
TRANSMISSION	MODEL 4R70W	TYPE 4-Speed Electronic Automatic		
	LOCKUP TORQUE CONVERTER? Yes			
	OVERDRIVE? Yes			
AXLE RATIO	3.27:1			
STEERING	Power Rack and Pinion, variable ratio			
TURNING CIRCLE (CURB TO CURB)	40.3 ft			
TIRE SIZE, LOAD & SPEED RATING	P225/60R16 97V Goodyear Eagle Plus RS-A			
SUSPENSION TYPE (FRONT)	Independent SLA with ball joint & coil spring			
SUSPENSION TYPE (REAR)	4 bar link with Watts Linkage			
GROUND CLEARANCE, MINIMUM	6.0 in	LOCATION Transmission		
	BRAKE SYSTEM Power, dual front piston, single rear piston, 4 circuit and ABS			
BRAKES, FRONT	TYPE Vented Disc	SWEPT AREA		273 sq in
BRAKES, REAR	TYPE Vented Disc	SWEPT AREA		176 sq in
FUEL CAPACITY	GALLONS 19.0	LITERS		71.9
GENERAL MEASUREMENTS	WHEELBASE 114.7	LENGTH		212.0
	TEST WEIGHT 4200	HEIGHT		58.5 in
HEADROOM	FRONT 39.4 in	REAR		38.0 in
LEGROOM	FRONT 42.5 in	REAR		39.6 in
SHOULDER ROOM	FRONT 60.8 in	REAR		60.3 in
HIPROOM	FRONT 57.1 in	REAR		59.0 in
INTERIOR VOLUME	FRONT 58.2 cu ft	REAR		51.1 cu ft
	COMB 109.3 cu ft	TRUNK		20.6 cu ft
EPA MILEAGE EST. (MPG)	CITY 16	HIGHWAY 21		COMBINED 18

FORD POLICE INTERCEPTOR
4.6L SPFI AXLE RATIO 3.55:1



TEST VEHICLE DESCRIPTION

MAKE Ford	MODEL Police Interceptor		SALES CODE NO. P71	
ENGINE DISPLACEMENT	CUBIC INCHES 281		LITERS	4.6
FUEL SYSTEM	Sequential Port Fuel Injection		EXHAUST	Dual
HORSEPOWER (SAENET)	250 @ 5000 RPM		ALTERNATOR	200
TORQUE	297 ft-lbs @ 4000 RPM		BATTERY	750 CCA
COMPRESSION RATIO	9.4:1			
TRANSMISSION	MODEL 4R70W	TYPE 4-Speed Electronic Automatic		
	LOCKUP TORQUE CONVERTER? Yes			
	OVERDRIVE? Yes			
AXLE RATIO	3.55:1			
STEERING	Power Rack and Pinion, variable ratio			
TURNING CIRCLE (CURB TO CURB)	40.3 ft			
TIRE SIZE, LOAD & SPEED RATING	P225/60R16 97V Goodyear Eagle Plus RS-A			
SUSPENSION TYPE (FRONT)	Independent SLA with ball joint & coil spring			
SUSPENSION TYPE (REAR)	4 bar link with Watts Linkage			
GROUND CLEARANCE, MINIMUM	6.0 in	LOCATION Transmission		
	Power, dual front piston, single rear piston, 4 circuit and ABS			
BRAKE SYSTEM	Power, dual front piston, single rear piston, 4 circuit and ABS			
BRAKES, FRONT	TYPE	Vented disc	SWEPT AREA	273 sq in
BRAKES, REAR	TYPE	Vented disc	SWEPT AREA	176 sq in
FUEL CAPACITY	GALLONS	19.0	LITERS	71.9
GENERAL MEASUREMENTS	WHEELBASE	114.7 in	LENGTH	212.0 in
	TEST WEIGHT	4185	HEIGHT	58.5 in
HEADROOM	FRONT	39.4 in	REAR	38.0 in
LEGROOM	FRONT	42.5 in	REAR	39.6 in
SHOULDER ROOM	FRONT	60.8 in	REAR	60.3 in
HIPROOM	FRONT	57.1 in	REAR	59.0 in
INTERIOR VOLUME	FRONT	58.2 cu ft	REAR	51.1 cu ft
	COMB	109.3 cu ft	TRUNK	20.6 cu ft
EPA MILEAGE EST. (MPG)	CITY	16	HIGHWAY	21
			COMBINED	18

**CHEVROLET IMPALA (9C1)
3.8L SPFI**



TEST VEHICLE DESCRIPTION

MAKE Chevrolet	MODEL Impala 9C1	SALES CODE NO. 1WF19	
ENGINE DISPLACEMENT	CUBIC INCHES 231	LITERS	3.8
FUEL SYSTEM	Sequential Port Fuel Injection	EXHAUST	Single
HORSEPOWER (SAENET)	200 @ 5200 RPM	ALTERNATOR	125 amp.
TORQUE	200 ft. lbs. @ 4000 RPM	BATTERY	690 CCA
COMPRESSION RATIO	9.4:1		
TRANSMISSION	MODEL 4T65E	TYPE 4 – Speed automatic	
	LOCKUP TORQUE CONVERTER? Yes		
	OVERDRIVE? Yes		
AXLE RATIO	3.29:1		
STEERING	Power Rack and Pinion		
TURNING CIRCLE (CURB TO CURB)	38.0 ft		
TIRE SIZE, LOAD & SPEED RATING	P225/60R16 Goodyear Eagle RSA		
SUSPENSION TYPE (FRONT)	Independent McPherson Strut, coil springs & stabilizer bar		
SUSPENSION TYPE (REAR)	Independent Tri-Link coil springs over strut & stabilizer bar		
GROUND CLEARANCE, MINIMUM	6.1 in	LOCATION Engine Cradle	
	BRAKE SYSTEM Power, dual hydraulic, anti-lock		
BRAKES, FRONT	TYPE Vented Disc	SWEPT AREA 235.4 sq in	
BRAKES, REAR	TYPE Solid Disc	SWEPT AREA 160.3 sq in	
FUEL CAPACITY	GALLONS 17.0	LITERS	64.3
GENERAL MEASUREMENTS	WHEELBASE 110.5 in	LENGTH	200.1 in
	TEST WEIGHT 3563	HEIGHT	57.3 in
HEADROOM	FRONT 39.2 in	REAR	36.8 in
LEGROOM	FRONT 42.2 in	REAR	38.4 in
SHOULDER ROOM	FRONT 59.0 in	REAR	58.9 in
HIPROOM	FRONT 56.5 in	REAR	55.7 in
INTERIOR VOLUME	FRONT 56.5 cu ft	REAR	48.2 cu ft
	COMB 104.7 cu ft	TRUNK	18.6 cu ft w/ compact spare
EPA MILEAGE EST. (MPG)	CITY 20	HIGHWAY 29	COMBINED 23

TEST VEHICLE DESCRIPTION SUMMARY

	Dodge Intrepid	Ford Police Interceptor 3.27:1
ENGINE DISPLACEMENT – CU. IN.	214	281
ENGINE DISPLACEMENT – LITERS	3.5	4.6
ENGINE FUEL SYSTEM	SPFI	SPFI
HORSEPOWER (SAE NET)	242	250
TORQUE (FT. LBS.)	248	297
COMPRESSION RATIO	9.9:1	9.4:1
AXLE RATIO	3.66:1	3.27:1
TURNING CIRCLE – FT. CURB TO CURB	37.6	40.3
TRANSMISSION	4 Speed elec. auto	4 Speed elec. auto
TRANSMISSION MODEL NUMBER	42LE	4R70W
LOCKUP TORQUE CONVERTER	Yes	Yes
TRANSMISSION OVERDRIVE	Yes	Yes
TIRE SIZE	P225/60R	P225/60R
WHEEL RIM SIZE – INCHES	16	16
GROUND CLEARANCE – INCHES	5.7	6.0
BRAKE SYSTEM	Power, ABS	Power, ABS
BRAKES – FRONT TYPE	Vented Disc	Vented Disc
BRAKES – REAR TYPE	Solid Disc	Vented Disc
FUEL CAPACITY – GALLONS	17	19
FUEL CAPACITY – LITERS	64.4	71.9
OVERALL LENGTH – INCHES	203.7	212.0
OVERALL HEIGHT – INCHES	55.9	58.5
TEST WEIGHT – LBS.	3567	4200
WHEELBASE – INCHES	113.0	114.7
HEADROOM FRONT – INCHES	38.3	39.4
HEADROOM REAR – INCHES	37.5	38.0
LEGROOM FRONT – INCHES	42.2	42.5
LEGROOM REAR – INCHES	39.1	39.6
SHOULDER ROOM FRONT – INCHES	59.0	60.8
SHOULDER ROOM REAR – INCHES	58.1	60.3
HIPROOM FRONT – INCHES	56.3	57.1
HIPROOM REAR – INCHES	56.6	59.0
INTERIOR VOLUME FRONT – CU. FT.	55.0	58.2
INTERIOR VOLUME REAR – CU. FT.	49.5	51.1
INTERIOR VOLUME COMB. – CU. FT.	104.5	109.3
TRUNK VOLUME – CU. FT.	18.4	20.6
EPA MILEAGE – CITY – MPG	19	15
EPA MILEAGE – HIGHWAY – MPG	27	22
EPA MILEAGE – COMBINED – MPG	22	18

TEST VEHICLE DESCRIPTION SUMMARY

	Ford Police Interceptor 3.55:1	Chevrolet Impala
ENGINE DISPLACEMENT – CU. IN.	281	231
ENGINE DISPLACEMENT – LITERS	4.6	3.8
ENGINE FUEL SYSTEM	SPFI	SPFI
HORSEPOWER (SAE NET)	250	200
TORQUE (FT. LBS.)	297	220
COMPRESSION RATIO	9.4:1	9.4:1
AXLE RATIO	3.55:1	3.29:1
TURNING CIRCLE – FT. CURB TO CURB	40.3	38.0
TRANSMISSION	4 Speed elec. auto	4 Speed elec. Auto
TRANSMISSION MODEL NUMBER	4R70W	4T65E
LOCKUP TORQUE CONVERTER	Yes	Yes
TRANSMISSION OVERDRIVE	Yes	Yes
TIRE SIZE	P225/60R	P225/60R
WHEEL RIM SIZE – INCHES	16	16
GROUND CLEARANCE – INCHES	6.0	6.1
BRAKE SYSTEM	Power, ABS	Power, ABS
BRAKES – FRONT TYPE	Vented Disc	Vented Disc
BRAKES – REAR TYPE	Vented Disc	Solid Disc
FUEL CAPACITY – GALLONS	19	17
FUEL CAPACITY – LITERS	71.9	64.3
OVERALL LENGTH – INCHES	212.0	200.1
OVERALL HEIGHT – INCHES	58.5	57.3
TEST WEIGHT – LBS.	4185	3563
WHEELBASE – INCHES	114.7	110.5
HEADROOM FRONT – INCHES	39.4	39.2
HEADROOM REAR – INCHES	38.0	36.8
LEGROOM FRONT – INCHES	42.5	42.2
LEGROOM REAR – INCHES	39.6	38.4
SHOULDER ROOM FRONT – INCHES	60.8	59.0
SHOULDER ROOM REAR – INCHES	60.3	58.9
HIPROOM FRONT – INCHES	57.1	56.5
HIPROOM REAR – INCHES	59.0	55.7
INTERIOR VOLUME FRONT – CU. FT.	58.2	56.5
INTERIOR VOLUME REAR – CU. FT.	51.1	55.7
INTERIOR VOLUME COMB. – CU. FT.	109.3	104.7
TRUNK VOLUME – CU. FT.	20.6	18.6
EPA MILEAGE – CITY – MPG	15	20
EPA MILEAGE – HIGHWAY – MPG	22	29
EPA MILEAGE – COMBINED – MPG	18	23

VEHICLE DYNAMICS TESTING

TEST OBJECTIVE

Determine each vehicle's high-speed pursuit or emergency handling characteristics and performance in comparison to the other vehicles in the test group. The course used is a 2-mile road-racing type configuration, containing hills, curves, and corners. The course simulates actual conditions encountered in pursuit or emergency driving situations in the field, with the exception of other traffic. The evaluation will be a true test of the success or failure of the vehicle manufacturers to offer vehicles that provide the optimum balance between handling (suspension components), acceleration (usable horsepower), and braking characteristics.

TEST METHODOLOGY

All vehicles will be driven over the course a total of 32 timed laps, using four separate drivers, each driving an 8 lap series. The final score for the vehicle will be the combined average (from the 4 drivers) of the 5 fastest laps for each driver during the 8 lap series.



Grattan Raceway Park



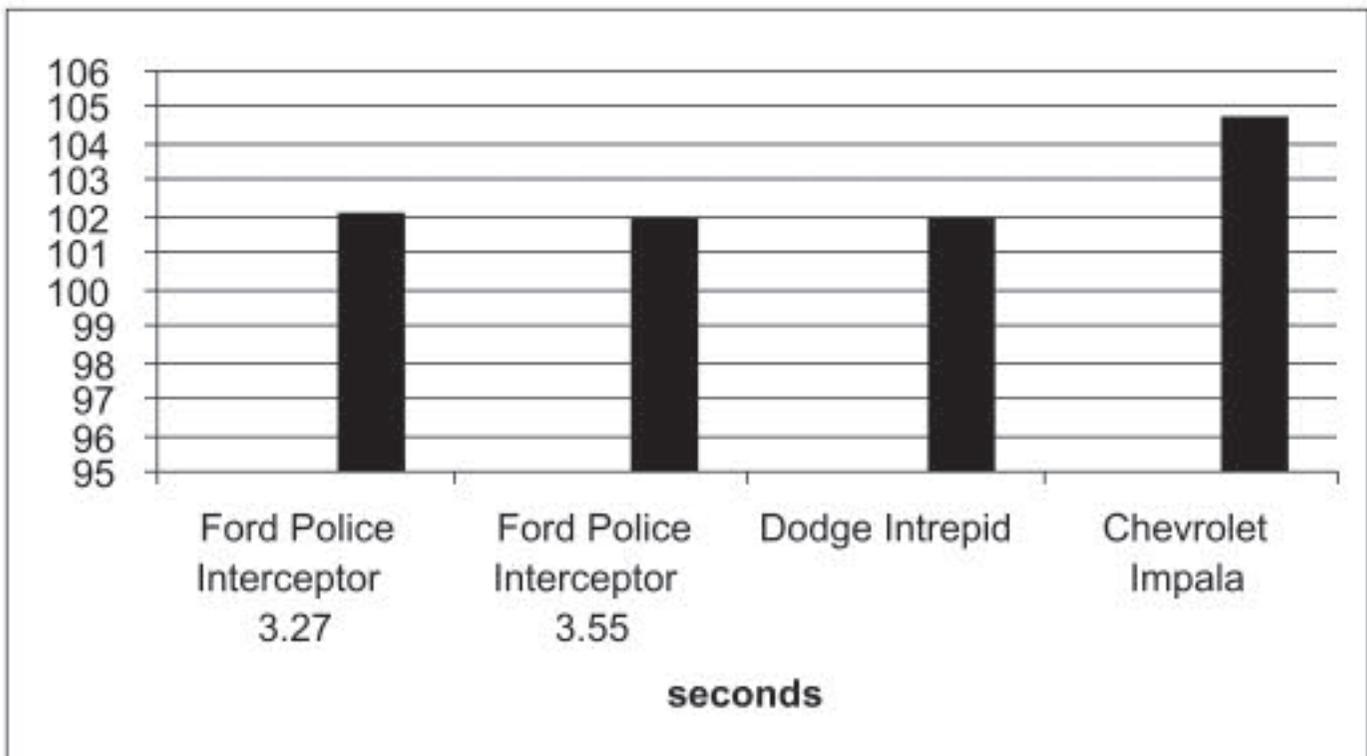
7201 Lessiter
Belding, Michigan 48809



Arrows indicate
Michigan State Police
Road Test Course and
Direction of Travel.

VEHICLE DYNAMICS TESTING

Ford Police Interceptor 3.27:1 SPFI 4.6 L	WILSON	01:42.20	01:42.42	01:42.56	01:42.76	01:42.87	01:42.56
	GROMAK	01:41.69	01:41.82	01:42.02	01:42.32	01:42.46	01:42.06
	FLEGEL	01:41.05	01:41.06	01:41.14	01:41.52	01:41.59	01:41.27
	CLARK	01:42.21	01:42.33	01:42.38	01:42.65	01:42.70	01:42.45
Overall Average							01:42.09
Ford Police Interceptor 3.55:1 SPFI 4.6 L	WILSON	01:42.53	01:42.68	01:42.76	01:42.86	01:42.90	01:42.75
	GROMAK	01:41.14	01:41.52	01:41.65	01:42.13	01:42.30	01:41.75
	FLEGEL	01:40.54	01:40.92	01:41.34	01:41.52	01:41.61	01:41.19
	CLARK	01:41.95	01:42.10	01:42.25	01:42.39	01:42.46	01:42.23
Overall Average							01:41.98
Chevrolet Impala 9C1 3.8L SPFI	WILSON	01:44.78	01:44.91	01:45.15	01:45.59	01:45.60	01:45.21
	GROMAK	01:44.24	01:44.46	01:44.48	01:44.67	01:44.73	01:44.52
	FLEGEL	01:43.84	01:43.98	01:44.21	01:44.33	01:44.35	01:44.14
	CLARK	01:44.74	01:44.79	01:44.93	01:45.02	01:45.27	01:44.95
Overall Average							01:44.70
Dodge Intrepid 3.5L SPFI	WILSON	01:42.85	01:43.25	01:43.26	01:43.34	01:43.43	01:43.23
	GROMAK	01:41.48	01:41.56	01:41.65	01:41.94	01:42.36	01:41.80
	FLEGEL	01:41.04	01:41.11	01:41.16	01:41.29	01:41.41	01:41.20
	CLARK	01:41.63	01:41.76	01:41.89	01:41.97	01:42.05	01:41.86
Overall Average							01:42.02



ACCELERATION AND TOP SPEED TESTING

ACCELERATION TEST OBJECTIVE

Determine the ability of each test vehicle to accelerate from a standing start to 60 mph, 80 mph, and 100 mph, and determine the distance to reach 110 mph and 120 mph.

ACCELERATION TEST METHODOLOGY

Using a DLS Smart Sensor – Optical non-contact Speed and Distance Sensor in conjunction with a lap top computer, each vehicle is driven through four acceleration sequences, two northbound and two southbound, to allow for wind direction. The four resulting times for each target speed are averaged and the average times used to derive scores on the competitive test for acceleration.

TOP SPEED TEST OBJECTIVE

Determine the actual top speed attainable by each test vehicle within a distance of 14 miles from a standing start.

TOP SPEED TEST METHODOLOGY

Following the fourth acceleration run, each test vehicle will continue to accelerate to the top speed attainable within 14 miles from the start of the run. The highest speed attained within the 14-mile distance will be the vehicle's score on the competitive test for top speed.



ACCELERATION AND TOP SPEED TESTS

TEST LOCATION: DaimlerChrysler Proving Grounds

DATE: September 20, 2003

MAKE & MODEL: Ford Interceptor 4.6L 3.27

BEGINNING TIME: 9:23 a.m.

WIND VELOCITY: 2.6 mph

WIND DIRECTION: 240°

TEMPERATURE: 56.9°

ACCELERATION

SPEEDS	TIME REQUIREMENTS*	RUN#1	RUN#2	RUN#3	RUN#4	AVERAGE
0 – 60	9.6 sec	8.45	8.36	8.47	8.49	8.44
0 – 80	16.4 sec.	14.02	13.74	13.90	13.86	13.88
0 – 100	27.1 sec.	23.48	23.17	23.52	23.03	23.30

DISTANCE TO REACH: 110 MPH .61 mile

120 MPH .93 mile

TOP SPEED ATTAINED: 128 mph

MAKE & MODEL: Ford Police Interceptor 4.6L 3.55

BEGINNING TIME: 9:48 a.m.

WIND VELOCITY: 3.8 mph

WIND DIRECTION: 218°

TEMPERATURE: 59.3°

ACCELERATION

SPEEDS	TIME REQUIREMENTS*	RUN#1	RUN#2	RUN#3	RUN#4	AVERAGE
0 – 60	9.6 sec	8.40	8.21	8.23	8.17	8.25
0 – 80	16.4 sec.	13.92	13.75	13.62	13.66	13.74
0 – 100	27.1 sec.	22.99	22.41	22.43	22.24	22.52

DISTANCE TO REACH: 110 MPH .59 mile

120 MPH N/A

TOP SPEED ATTAINED: 118 mph

*Michigan State Police minimum requirement.

ACCELERATION AND TOP SPEED TESTS

TEST LOCATION: DaimlerChrysler Proving Grounds

DATE: September 20, 2003

MAKE & MODEL: Dodge Intrepid 3.5L SPFI

BEGINNING TIME: 8:58 a.m.

WIND VELOCITY: 3.6 mph

WIND DIRECTION: 210°

TEMPERATURE: 55.1°

ACCELERATION

SPEEDS	TIME REQUIREMENTS*	RUN#1	RUN#2	RUN#3	RUN#4	AVERAGE
0 – 60	9.6 sec	8.79	8.47	8.54	8.45	8.56
0 – 80	16.4 sec.	14.43	14.15	14.17	13.86	14.15
0 – 100	27.1 sec.	24.09	23.40	23.48	23.25	23.56

DISTANCE TO REACH: 110 MPH .61 mile

120 MPH .87 mile

TOP SPEED ATTAINED: 135 mph

MAKE & MODEL: Chevrolet Impala 3.8L SPFI

BEGINNING TIME: 8:34 a.m.

WIND VELOCITY: 1.3 mph

WIND DIRECTION: 111°

TEMPERATURE: 49.1°

ACCELERATION

SPEEDS	TIME REQUIREMENTS*	RUN#1	RUN#2	RUN#3	RUN#4	AVERAGE
0 – 60	9.6 sec	9.21	9.02	8.98	8.78	9.00
0 – 80	16.4 sec.	15.69	15.14	15.16	14.98	15.24
0 – 100	27.1 sec.	27.30	26.25	26.33	25.78	26.42

DISTANCE TO REACH: 110 MPH .71 mile

120 MPH 1.20 mile

TOP SPEED ATTAINED: 123 mph

*Michigan State Police minimum requirement.

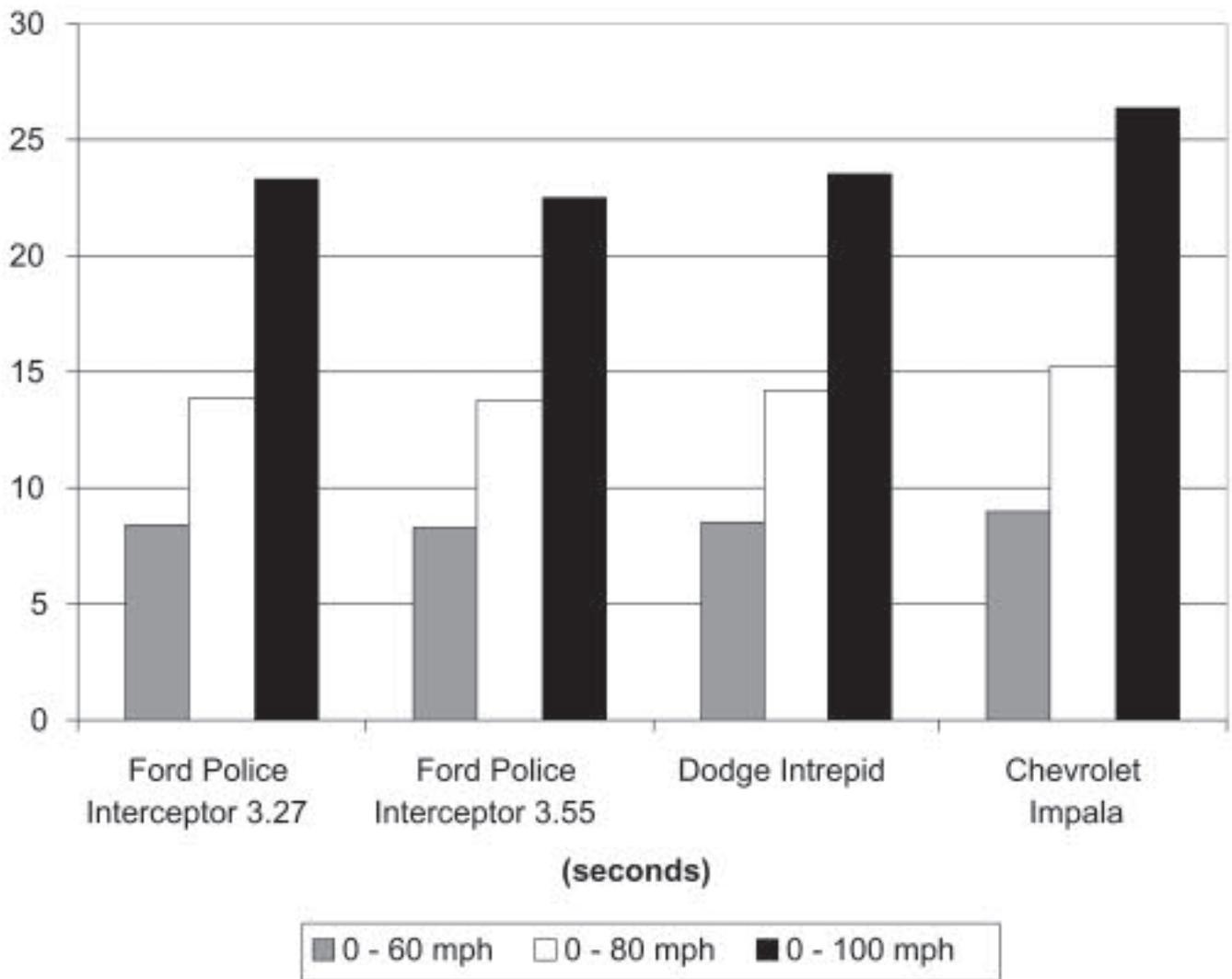
SUMMARY OF ACCELERATION AND TOP SPEED

ACCELERATION*		Ford Police Interceptor 4.6 L 3.27	Ford Police Interceptor 4.6 L 3.55	Dodge Intrepid 3.5 L	Chevrolet Impala 9C1 3.8 L
0 – 20 mph	(sec.)	1.78	1.78	1.91	2.00
0 – 30 mph	(sec.)	3.09	2.99	3.13	3.20
0 – 40 mph	(sec.)	4.47	4.42	4.50	4.58
0 – 50 mph	(sec.)	6.20	6.15	6.37	6.51
0 – 60 mph	(sec.)	8.44	8.25	8.56	9.00
0 – 70 mph	(sec.)	10.89	10.63	11.12	11.76
0 – 80 mph	(sec.)	13.88	13.74	14.15	15.24
0 – 90 mph	(sec.)	18.15	17.90	18.40	20.31
0 – 100 mph	(sec.)	23.30	22.52	23.56	26.42
TOP SPEED	(mph)	128	118	135	123
DISTANCE TO REACH					
110 mph	(miles)	.61	.59	.61	.71
120 mph	(miles)	.93	N/A	.87	1.20
QUARTER MILE					
Time	(sec.)	16.44	16.34	16.56	16.89
Speed	(miles)	86.58	86.43	86.03	83.58



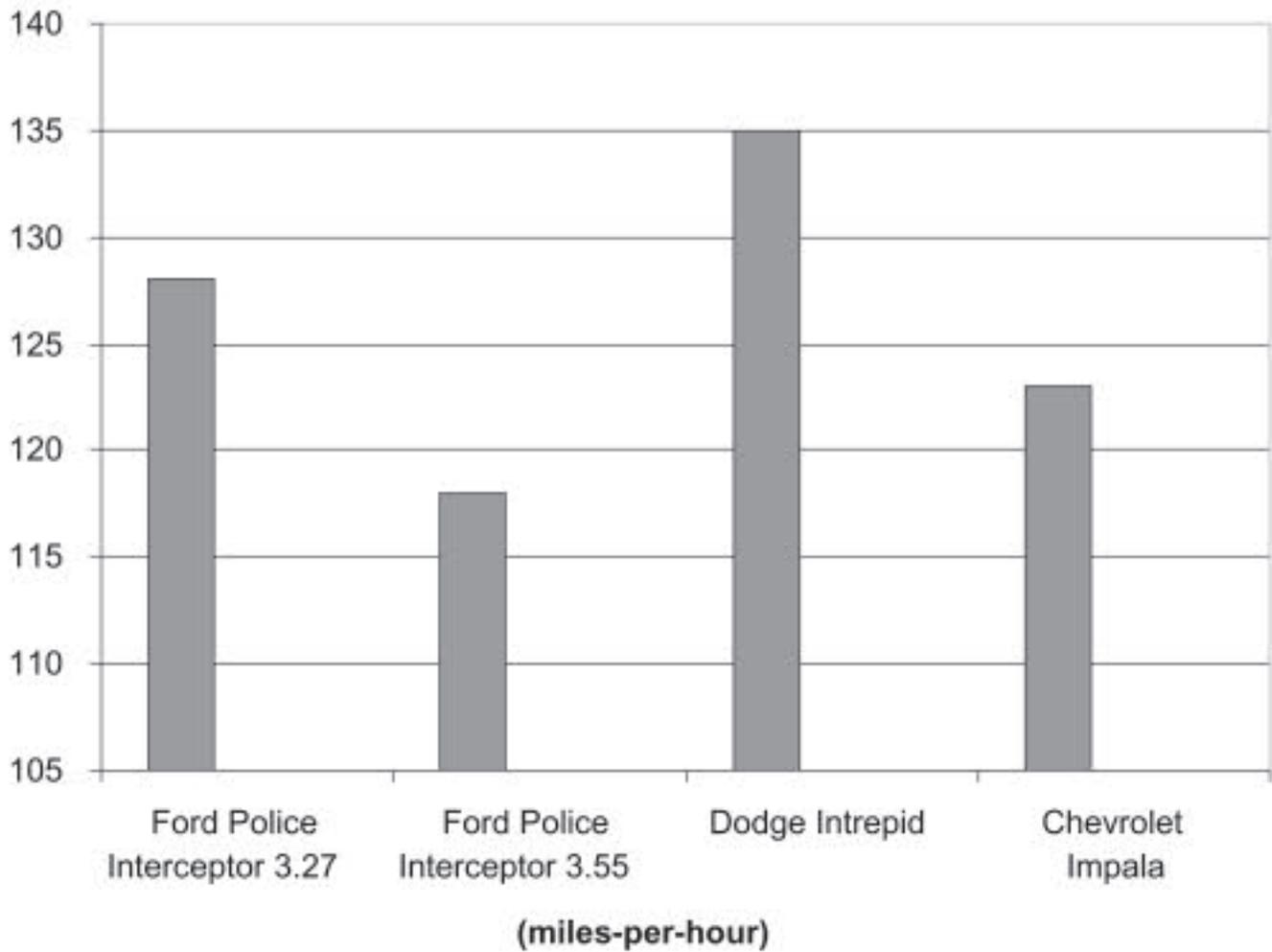
2004 ACCELERATION COMPARISON

ACCELERATION TIMES



2004 TOP SPEED COMPARISON

TOP SPEED ATTAINED



BRAKE TESTING

BRAKE TEST OBJECTIVE

Determine the deceleration rate attained by each test vehicle on twelve 60 – 0 mph impending skid (threshold) stops, with ABS in operation if the vehicle is so equipped. Each vehicle will be scored on the average deceleration rate it attains.

BRAKE TEST METHODOLOGY

Each vehicle will make two decelerations at specific predetermined points on the test road from 90 – 0 mph at 22 ft/s², with the driver using a decelerometer to maintain the deceleration rate. Immediately after these "heat-up" stops are completed, the vehicle will be turned around and will make six measured 60 – 0 mph impending skid (threshold) stops with ABS in operation, if so equipped, at specific predetermined points. Following a four 4-minute heat soak, the entire sequence will be repeated. The exact initial velocity at the beginning of each of the 60 – 0 mph decelerations, and the exact distance required to make each stop will be recorded by means of a non contact optical sensor in conjunction with electronic speed and distance meters. The data resulting from the twelve total stops will be used to calculate the average deceleration rate which is the vehicle's score for this test.

DECELERATION RATE FORMULA

$$\text{Deceleration Rate (DR)} = \frac{\text{Initial Velocity}^2(\text{IV squared})}{2 \text{ times Stopping Distance (SD)}} = \frac{(\text{IV})^2}{2 (\text{SD})}$$

EXAMPLE:

$$\begin{array}{ll} \text{Initial Velocity} & = 89.175 \text{ ft/s (60.8 mph x 1.4667*)} \\ \text{Stopping Distance} & = 171.4 \text{ ft.} \end{array}$$

$$\text{DR} = \frac{(\text{IV})^2}{2(\text{SD})} = \frac{(89.175)^2}{2(171.4)} = \frac{7952.24}{342.8} = 23.198 \text{ ft/s}^2$$

Once a vehicle's average deceleration rate has been determined, it is possible to calculate the stopping distance from any given speed by utilizing the following formula:

Select a speed; translate that speed into feet per second; square the feet per second figure by multiplying it by itself; divide the resultant figure by 2; divide the remaining figure by the average deceleration rate of the vehicle in question.

EXAMPLE:

$$60 \text{ mph} = 88.002 \text{ ft/s} \times 88.002 = 7744.352 / 2 = 3872.176 / 23.198 \text{ ft/s}^2 = 166.9 \text{ ft.}$$

*Initial velocity must be expressed in terms of feet per second, with 1 mile per hour being equal to 1.4667 feet per second.

BRAKE TESTING

TEST LOCATION: DaimlerChrysler Proving Grounds

DATE: September 20, 2003

BEGINNING Time: 12:07 p.m.

TEMPERATURE: 64.2° F

MAKE & MODEL: Ford Police Interceptor 4.6L 3.27

BRAKE SYSTEM: Anti-lock

Phase I

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.²)
TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	60.3 mph	155.5 feet	25.15 ft/s ²
Stop #2	59.9 mph	153.6 feet	25.13 ft/s ²
Stop #3	59.5 mph	153.4 feet	24.82 ft/s ²
Stop #4	60.0 mph	150.0 feet	25.81 ft/s ²
Stop #5	59.5 mph	148.4 feet	25.66 ft/s ²
Stop #6	59.7 mph	144.8 feet	26.47 ft/s ²

AVERAGE DECELERATION RATE

25.51 ft/s²

HEAT SOAK (4 minutes)

Phase II

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.²)
TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	59.3 mph	142.7 feet	26.51 ft/s ²
Stop #2	60.1 mph	148.6 feet	26.14 ft/s ²
Stop #3	60.0 mph	148.3 feet	26.11 ft/s ²
Stop #4	59.7 mph	145.8 feet	26.29 ft/s ²
Stop #5	59.7 mph	145.6 feet	26.33 ft/s ²
Stop #6	59.6 mph	145.7 feet	26.22 ft/s ²

AVERAGE DECELERATION RATE

26.27 ft/s²

Phase III

Evidence of severe fading?	Yes/No
Vehicle stopped in straight line?	<u>No</u>
Vehicle stopped within correct lane?	<u>Yes</u>
	<u>Yes</u>

OVERALL AVERAGE DECEL. RATE:

25.89 ft/s²

Projected Stopping Distance from 60.0 mph **149.6**

BRAKE TESTING

TEST LOCATION: DaimlerChrysler Proving Grounds

DATE: September 20, 2003

BEGINNING Time: 12:36 p.m.

TEMPERATURE: 64.7°F

MAKE & MODEL: Ford Police Interceptor 4.6L 3.55

BRAKE SYSTEM: Anti-lock

Phase I

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.²)

TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	59.7 mph	145.6 feet	26.33 ft/s ²
Stop #2	60.1 mph	154.1 feet	25.21 ft/s ²
Stop #3	60.2 mph	153.9 feet	25.33 ft/s ²
Stop #4	59.7 mph	151.9 feet	25.24 ft/s ²
Stop #5	60.6 mph	151.8 feet	26.02 ft/s ²
Stop #6	60.5 mph	150.8 feet	26.11 ft/s ²

AVERAGE DECELERATION RATE

25.71 ft/s²

HEAT SOAK (4 minutes)

Phase II

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.²)

TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	60.0 mph	149.9 feet	25.83 ft/s ²
Stop #2	60.4 mph	152.6 feet	25.71 ft/s ²
Stop #3	59.7 mph	146.9 feet	26.10 ft/s ²
Stop #4	60.1 mph	151.6 feet	25.63 ft/s ²
Stop #5	60.3 mph	151.0 feet	25.90 ft/s ²
Stop #6	59.5 mph	149.5 feet	25.47 ft/s ²

AVERAGE DECELERATION RATE

25.77 ft/s²

Phase III

Evidence of severe fading?	Yes/No
Vehicle stopped in straight line?	<u>No</u>
Vehicle stopped within correct lane?	<u>Yes</u>
	<u>Yes</u>

OVERALL AVERAGE DECEL. RATE:

25.74 ft/s²

Projected Stopping Distance from 60.0 mph **150.4**

BRAKE TESTING

TEST LOCATION: DaimlerChrysler Proving Grounds

DATE: September 20, 2003

BEGINNING Time: 10:01 a.m.

TEMPERATURE: 59.6° F

MAKE & MODEL: Dodge Intrepid 3.5L

BRAKE SYSTEM: Anti-lock

Phase I

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.²)

TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	60.1 mph	140.5 feet	27.65 ft/s ²
Stop #2	60.0 mph	138.4 feet	27.98 ft/s ²
Stop #3	59.5 mph	139.2 feet	27.36 ft/s ²
Stop #4	59.7 mph	135.2 feet	28.35 ft/s ²
Stop #5	59.4 mph	137.0 feet	27.70 ft/s ²
Stop #6	60.1 mph	139.2 feet	27.91 ft/s ²

AVERAGE DECELERATION RATE

27.83 ft/s²

HEAT SOAK (4 minutes)

Phase II

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.²)

TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	59.9 mph	136.1 feet	28.36 ft/s ²
Stop #2	59.4 mph	134.4 feet	28.24 ft/s ²
Stop #3	59.5 mph	137.3 feet	27.73 ft/s ²
Stop #4	59.9 mph	132.7 feet	29.08 ft/s ²
Stop #5	59.8 mph	135.7 feet	28.34 ft/s ²
Stop #6	59.9 mph	131.0 feet	29.46 ft/s ²

AVERAGE DECELERATION RATE

28.54 ft/s²

Phase III

Evidence of severe fading?	<u>No</u>
Vehicle stopped in straight line?	<u>Yes</u>
Vehicle stopped within correct lane?	<u>Yes</u>

OVERALL AVERAGE DECEL. RATE:

28.18 ft/s²

Projected Stopping Distance from 60.0 mph **137.4**

BRAKE TESTING

TEST LOCATION: DaimlerChrysler Proving Grounds

DATE: September 20, 2003

BEGINNING Time: 9:25 a.m.

TEMPERATURE: 56.9° F

MAKE & MODEL: Chevrolet Impala 9C1 3.8L

BRAKE SYSTEM: Anti-lock

Phase I

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.²)

TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	60.0 mph	128.7 feet	30.09 ft/s ²
Stop #2	59.6 mph	130.9 feet	29.19 ft/s ²
Stop #3	60.0 mph	134.7 feet	28.75 ft/s ²
Stop #4	59.6 mph	133.8 feet	28.56 ft/s ²
Stop #5	59.7 mph	133.9 feet	28.63 ft/s ²
Stop #6	59.8 mph	136.1 feet	28.26 ft/s ²

AVERAGE DECELERATION RATE

28.91 ft/s²

HEAT SOAK (4 minutes)

Phase II

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.²)

TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	59.9 mph	134.9 feet	28.61 ft/s ²
Stop #2	59.9 mph	133.5 feet	28.91 ft/s ²
Stop #3	59.7 mph	135.5 feet	28.29 ft/s ²
Stop #4	60.1 mph	134.1 feet	28.97 ft/s ²
Stop #5	60.0 mph	131.7 feet	29.40 ft/s ²
Stop #6	59.5 mph	133.3 feet	28.57 ft/s ²

AVERAGE DECELERATION RATE

28.79 ft/s²

Phase III

Evidence of severe fading?	Yes/No
Vehicle stopped in straight line?	<u>No</u>
Vehicle stopped within correct lane?	<u>Yes</u>

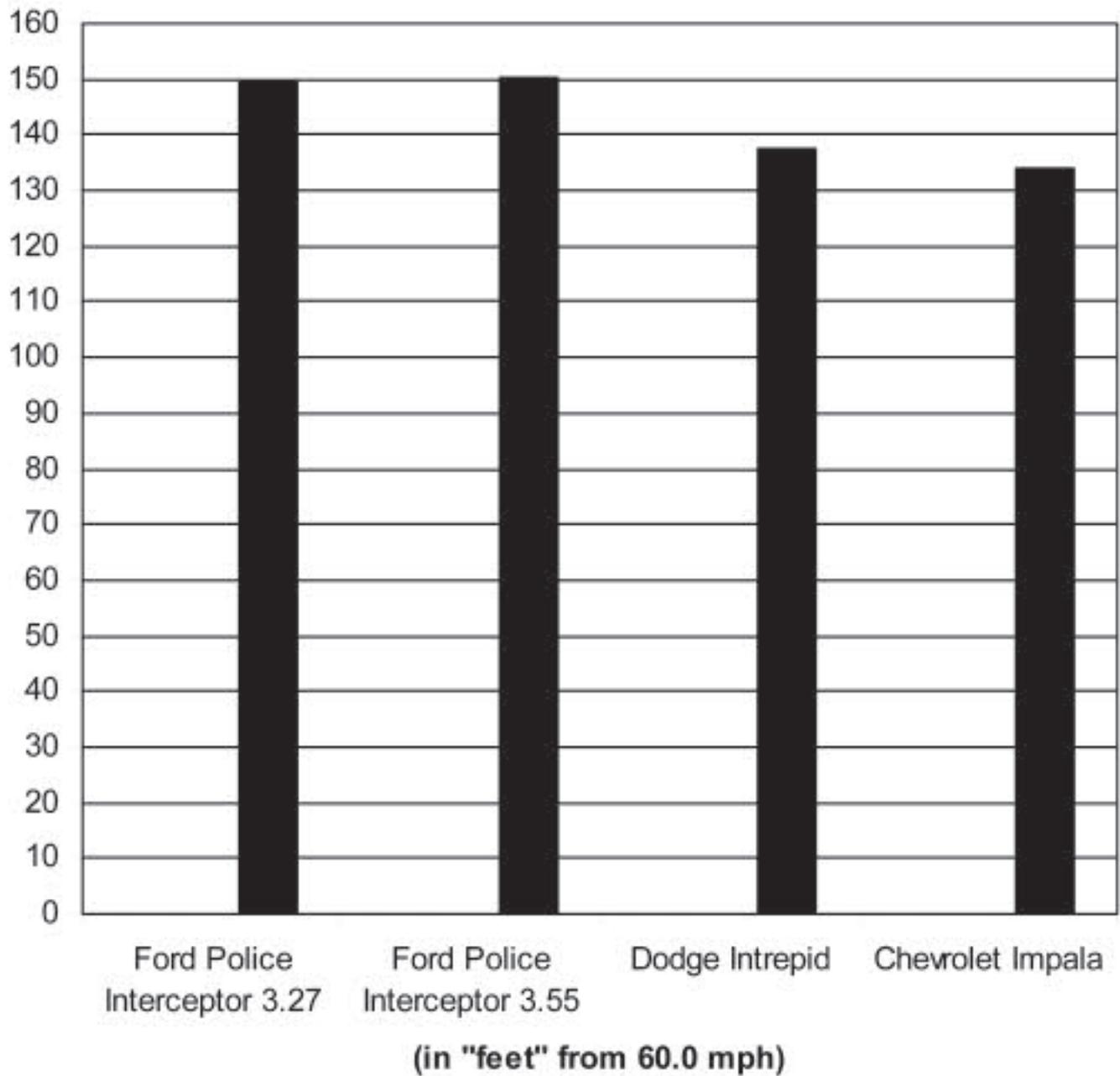
OVERALL AVERAGE DECEL. RATE:

28.85 ft/s²

Projected Stopping Distance from 60.0 mph **134.2**



2004 Brake Testing Comparison STOPPING DISTANCES



ERGONOMICS AND COMMUNICATIONS

TEST OBJECTIVE

Rate each test vehicle's ability to:

1. Provide a suitable environment for the patrol officer in the performance of his/her assigned tasks.
2. Accommodate the required communications and emergency warning equipment and assess the relative difficulty of such installations.

TEST METHODOLOGY

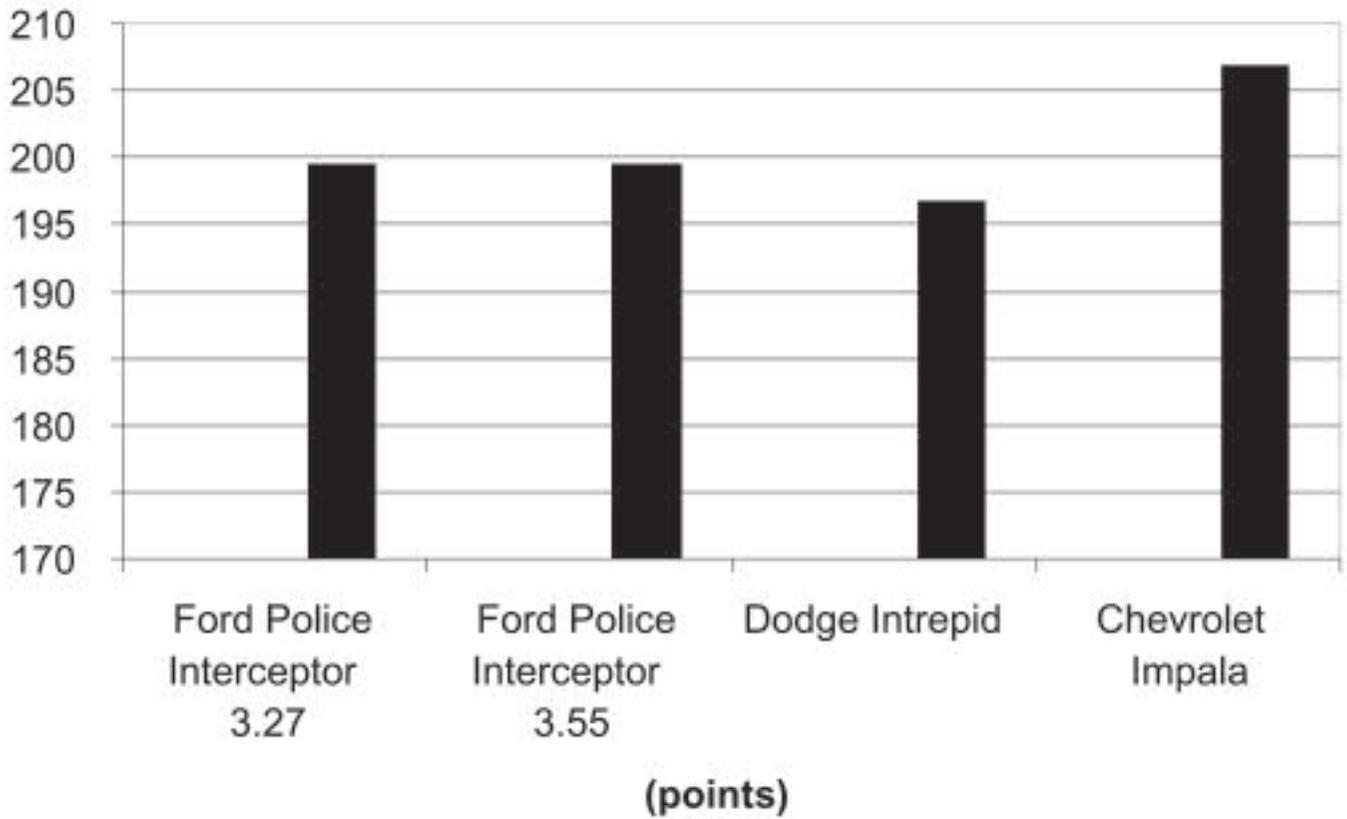
Utilizing the ergonomics portion of the form, a minimum of four officers (in this case 10) will individually and independently compare and score each test vehicle on the various comfort, instrumentation, and visibility items. The installation and communications portion of the evaluation will be conducted by personnel from the Michigan State Police Communications Division and Vehicle and Travel Services, based upon the relative difficulty of the necessary installations. Each factor will be graded on a 1 to 10 scale, with 1 representing "totally unacceptable," 5 representing "average," and 10 representing "superior." The scores will be averaged to minimize personal prejudice for or against any given vehicle.



ERGONOMICS AND COMMUNICATIONS

ERGONOMICS	Ford Police Interceptor 3.27	Ford Police Interceptor 3.55	Dodge Intrepid	Chevrolet Impala
FRONT SEAT				
Padding	6.80	6.80	6.70	7.30
Depth of Bucket Seat	7.00	7.00	6.90	7.60
Adjustability – Front to Rear	7.30	7.30	7.20	7.10
Upholstery	6.70	6.70	7.20	6.90
Bucket Seat Design	5.80	5.80	6.20	7.20
Headroom	7.80	7.80	7.30	7.40
Seatbelts	7.10	7.10	7.80	7.40
Ease of Entry and Exit	6.20	6.20	5.90	6.00
Overall Comfort Rating	7.00	7.00	6.80	6.90
REAR SEAT				
Leg room – Front seat back	5.60	5.60	6.40	5.50
Ease of Entry and Exit	4.60	4.60	5.50	5.20
INSTRUMENTATION				
Clarity	8.30	8.30	8.20	8.30
Placement	7.70	7.70	8.10	8.30
VEHICLE CONTROLS				
Pedals, Size and Position	7.90	7.90	7.90	7.90
Power Window Switch	8.00	8.00	7.50	8.10
Inside Door Lock Switch	6.00	6.00	7.80	7.70
Automatic Door Lock Switch	7.20	7.20	6.80	7.10
Outside Mirror Controls	6.90	6.90	6.80	8.78
Steering Wheel, Size, Tilt Release, and Surface	6.70	6.70	7.90	8.10
Heat/AC Vent Placement and Adjustability	8.10	8.10	7.60	7.30
VISIBILITY				
Front (Windshield)	8.10	8.10	8.00	8.10
Rear (Back Window)	7.40	7.40	6.30	6.30
Left Rear Quarter	7.40	7.40	5.70	7.40
Right Rear Quarter	7.60	7.60	6.10	7.70
Outside Rear View Mirrors	6.30	6.30	4.10	7.60
COMMUNICATIONS				
Dashboard Accessibility	8.00	8.00	8.00	7.60
Trunk Accessibility	8.00	8.00	8.00	8.00
Engine Compartment	8.00	8.00	8.00	8.00
TOTAL SCORES	199.50	199.50	196.70	206.78

**2004
ERGONOMICS/COMMUNICATIONS
COMPARISON
VEHICLE SCORES**



FUEL ECONOMY

TEST OBJECTIVE

Determine the fuel economy potential of all vehicles being evaluated. The data used for scoring are both valid and reliable in a comparison sense, while not necessarily being an accurate predictor of actual fuel economy in police patrol service.

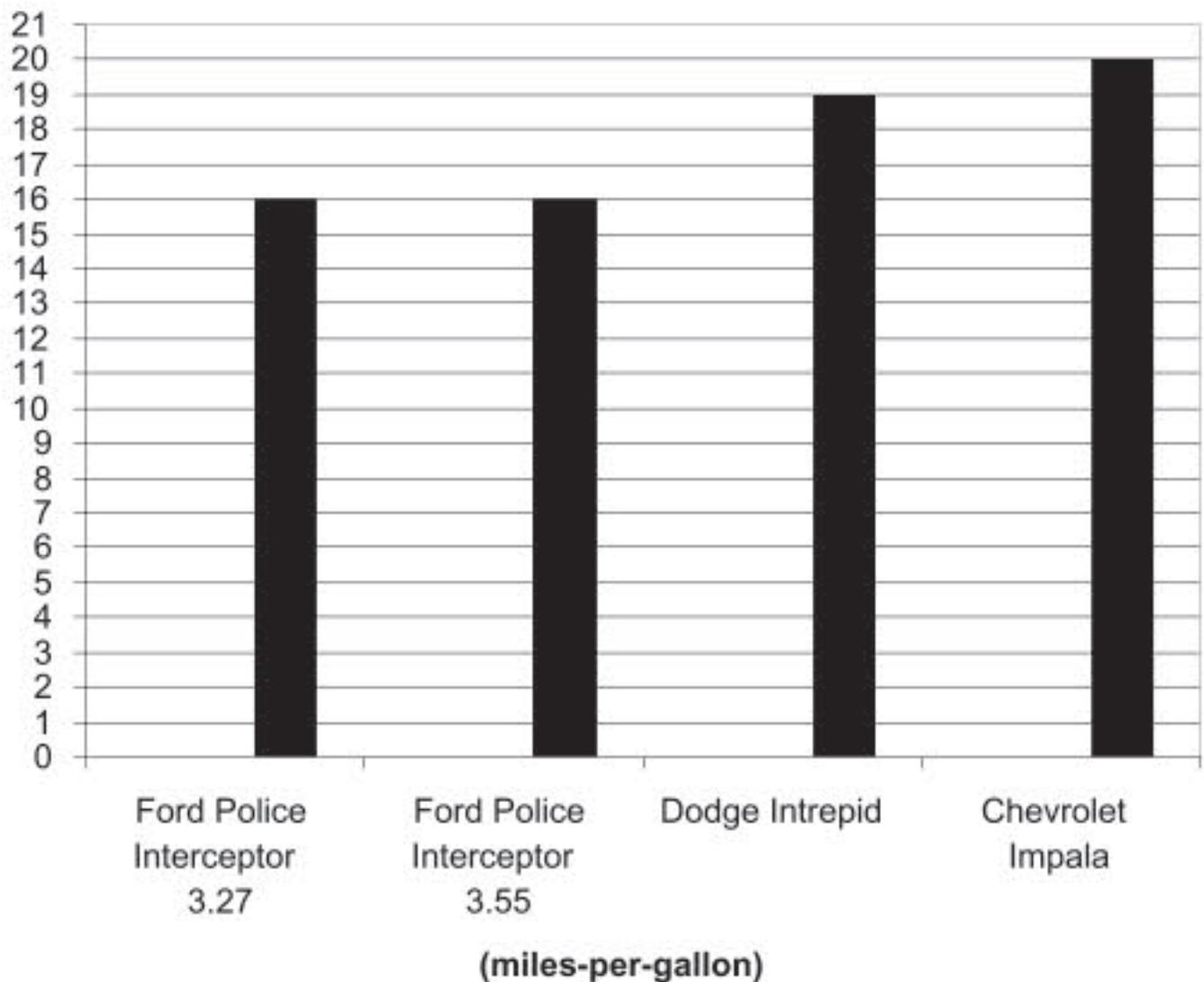
TEST METHODOLOGY

The vehicles will be scored based on estimates for city fuel economy to the nearest 1/10th mile per gallon (mpg) developed from data supplied by the vehicle manufacturer and certified by the Environmental Protection Agency.

Vehicles Make/Model/Engine	E.P.A. Miles Per Gallon		
	City*	Highway	Combined
Ford 4.6L SPFI Police Interceptor 3.27	16.0 (17.7)	21	18
Ford 4.6L SPFI Police Interceptor 3.55	16.0 (17.7)	21	18
Dodge Intrepid 3.5L SPFI	19 (20.9)	27	22
Chevrolet Impala 3.8L SPFI	20 (19.5)	29	23

*Scored on city mileage only to the nearest 1/10 mpg.

2004 FUEL ECONOMY COMPARISON "CITY" EPA ESTIMATES



MICHIGAN STATE POLICE SCORING AND BID ADJUSTMENT METHODOLOGY*

STEP I: RAW SCORES

Raw scores are developed, through testing, for each vehicle in each of six evaluation categories. The raw scores are expressed in terms of seconds, feet per second², miles-per-hour, points, and miles-per-gallon.

VEHICLE DYNAM. (seconds)	BRAKING RATE (ft/sec ²)	ACCEL. (seconds)	TOP SPEED (mph)	ERGONOMICS & COMMUN. (points)	FUEL ECONOMY (mpg)
92.210	26.380	45.790	115.000	173.900	14.300

STEP II: DEVIATION FACTOR

In each evaluation category, the best scoring vehicle's score is used as the benchmark against which each of the other vehicles' scores are compared. (In the Vehicle Dynamics and Acceleration categories the lowest score is best, while in the remainder of the categories the highest score is best.) The best scoring vehicle in a given category received a deviation factor of "0." The "deviation factor" is then calculated by determining the absolute difference between each vehicle's raw score and the best score in that category. The absolute difference is then divided by the best score, with the result being the "deviation factor."

CAR MAKE MODEL	TOP SPEED
CAR "A"	115.000 .042
CAR "B"	118.800 .010
CAR "C"	117.900 .018
CAR "D"	120.000 0

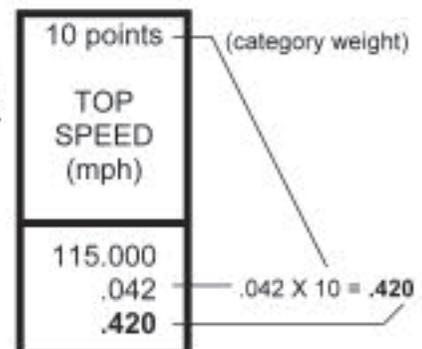
EXAMPLE:

$$\begin{array}{rclclcl}
 \text{Best Score} & & \text{Other Vehicle} & & \text{Absolute} & & \text{Best} & & \text{Deviation Factor} \\
 \text{(Car "D")} & & \text{Score (Car "A")} & & \text{Difference} & & \text{Score} & & \text{(Car "A")} \\
 120.000 & - & 115.000 & = & 5 & / & 120.000 & = & .042
 \end{array}$$

STEP III: WEIGHTED CATEGORY SCORE

Each vehicle's weighted category score is determined by multiplying the deviation factor (as determined in Step II) by the category weight.

$$\begin{array}{r}
 \text{RAW SCORE} \\
 \text{DEVIATION FACTOR} \\
 \hline
 \text{WEIGHTED CATEGORY SCORE}
 \end{array}$$



*All mathematical computations are to be rounded to the third decimal place.

STEP IV: TOTAL WEIGHTED SCORE

Adding together the six (6) weighted category scores for that vehicle derives the total weighted score for each vehicle.

EXAMPLE:

CAR	30 pts. VEH. DYN. (seconds)	25 pts. BRAKE DECEL. (ft/sec ²)	20 pts. ACCEL. (seconds)	10 pts. TOP SPEED (mph)	10 pts. ERGO/ COMM. (points)	5 pts. FULE ECON. (mpg)	TOTAL WEIGHTED SCORE
Car "A"	92.210 .018 .540	45.790 .163 4.075	26.380 0 0	115.000 .042 .420	173.900 .184 1.840	14.300 0 0	6.875

STEP V: BID ADJUSTMENT FIGURE

The bid adjustment figure that we have chosen to use is one percent (1%) of the lowest bid price received. As an example, in this and the following two steps, the lowest bid price received was \$15,238.00, which results in a bid adjustment figure of **\$152.38**.

STEP VI: ACTUAL DOLLAR ADJUSTMENT

The actual dollar adjustment for a vehicle is determined by multiplying that vehicle's total weighted score by the bid adjustment figure as shown at right.

TOTAL WTD. SCORE	BID ADJ. FIGURE	ACTUAL DOLLAR ADJ.
X		=
6.875	\$152.38	\$1,047.61

STEP VII: ADJUSTED BID PRICE

The actual dollar adjustment amount arrived at for each vehicle is added to that vehicle's bid price. Provided other necessary approvals are received, the vehicle with the lowest adjusted bid price will be the vehicle purchased. (The amount paid for the purchased vehicles will be the actual bid price.)

ACTUAL DOLLAR ADJ.	ACTUAL BID PRICE	ADJ. BID PRICE
+		=
\$955.42	\$15,473.00	\$16,520.61

PERFORMANCE COMPARISONS OF 2003 AND 2004 TEST VEHICLES

The following charts illustrate the scores achieved by each make and model of vehicle tested for model years 2003 and 2004. The charts presented are for the following performance categories:

- Vehicle Dynamics
- Acceleration 0 – 60 mph
- Acceleration 0 – 80 mph
- Acceleration 0 – 100 mph
- Top Speed
- Braking (Calculated 60 – 0 mph Stopping Distance)

The reader should bear in mind the following information regarding variables when reviewing the 2003 – 2004 performance comparison charts. While as many variables as possible are eliminated from a given year's testing, those that occur over the span of a full year are sometimes impossible to eliminate.

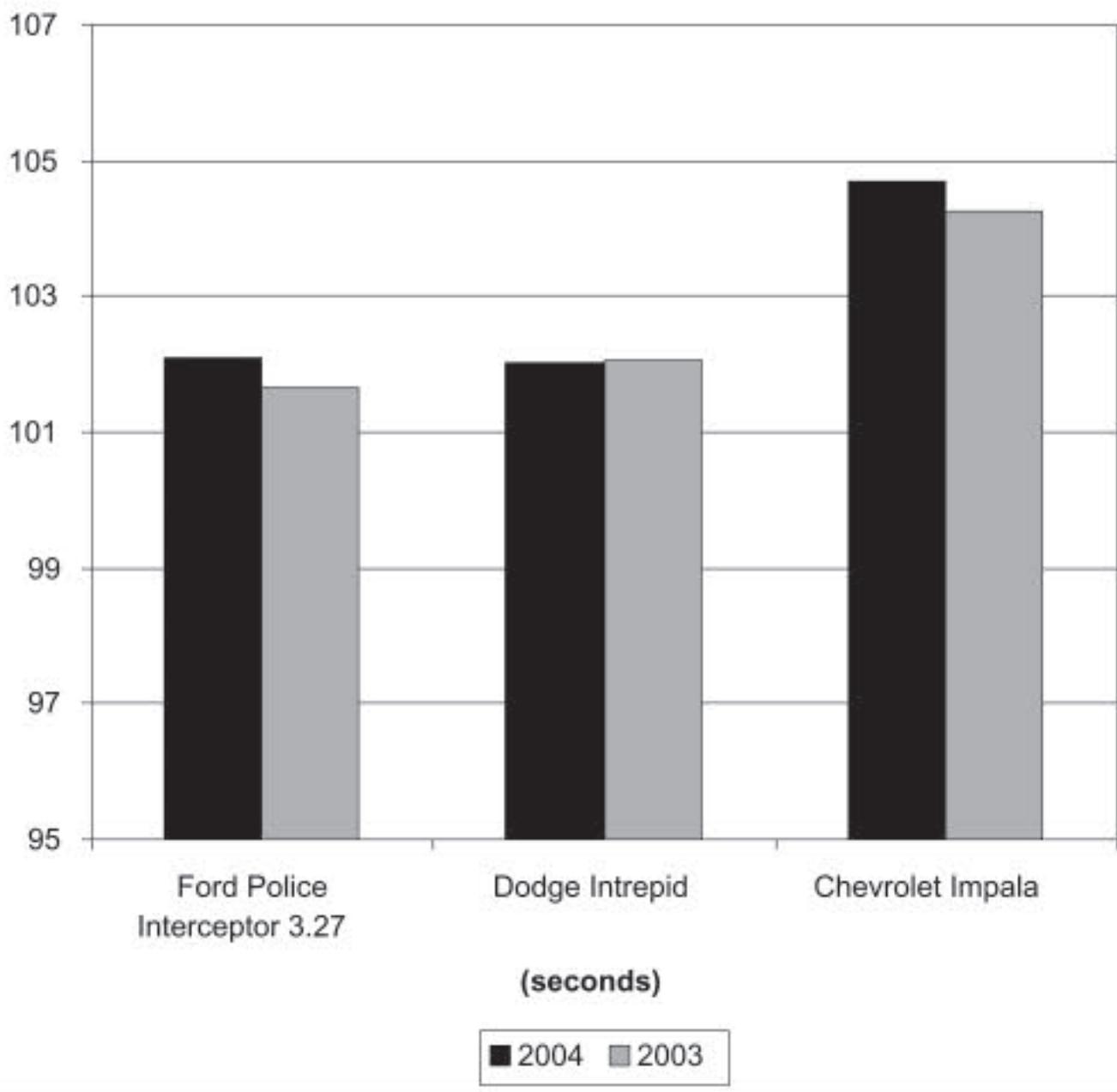
The acceleration, top speed, and brake testing of both the 2003 and 2004 model year vehicles were conducted in the latter half of September. Temperatures on the test day in September of 2002 ranged between 60.9° F at the start of testing to a high of approximately 79.5° F during the afternoon.

Temperatures during the testing this year varied, ranging between 44.7° F when testing started, to an afternoon high of 69.1° F. Such things as temperature, humidity, and barometric pressure affect the performance of internal combustion engines and brake components, and may cause minor differences from one year's evaluation to the next.

Another factor to be considered is the individual differences between two cars of the same make and model. The test cars that we evaluate are representative of their given make and model. Other cars of the same make and model will not, however, be exactly the same, particularly when it comes to performance. (It is well known that two consecutive cars off the same assembly line will perform slightly differently from each other.) Minor differences in performance from year to year within the same make and model are not only possible, but are to be expected.

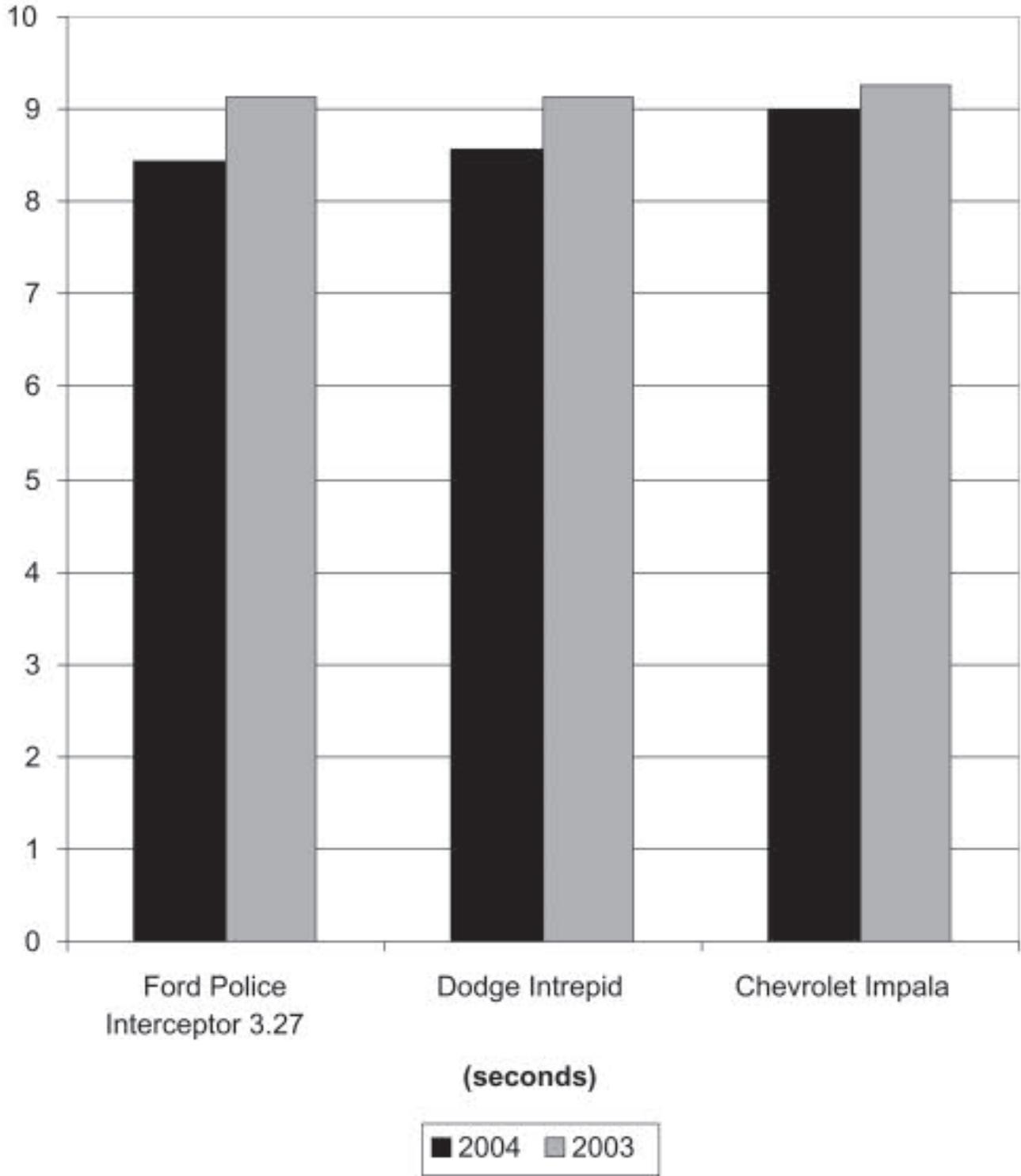
2003-04 Vehicle Dynamics Comparison

LAP TIMES



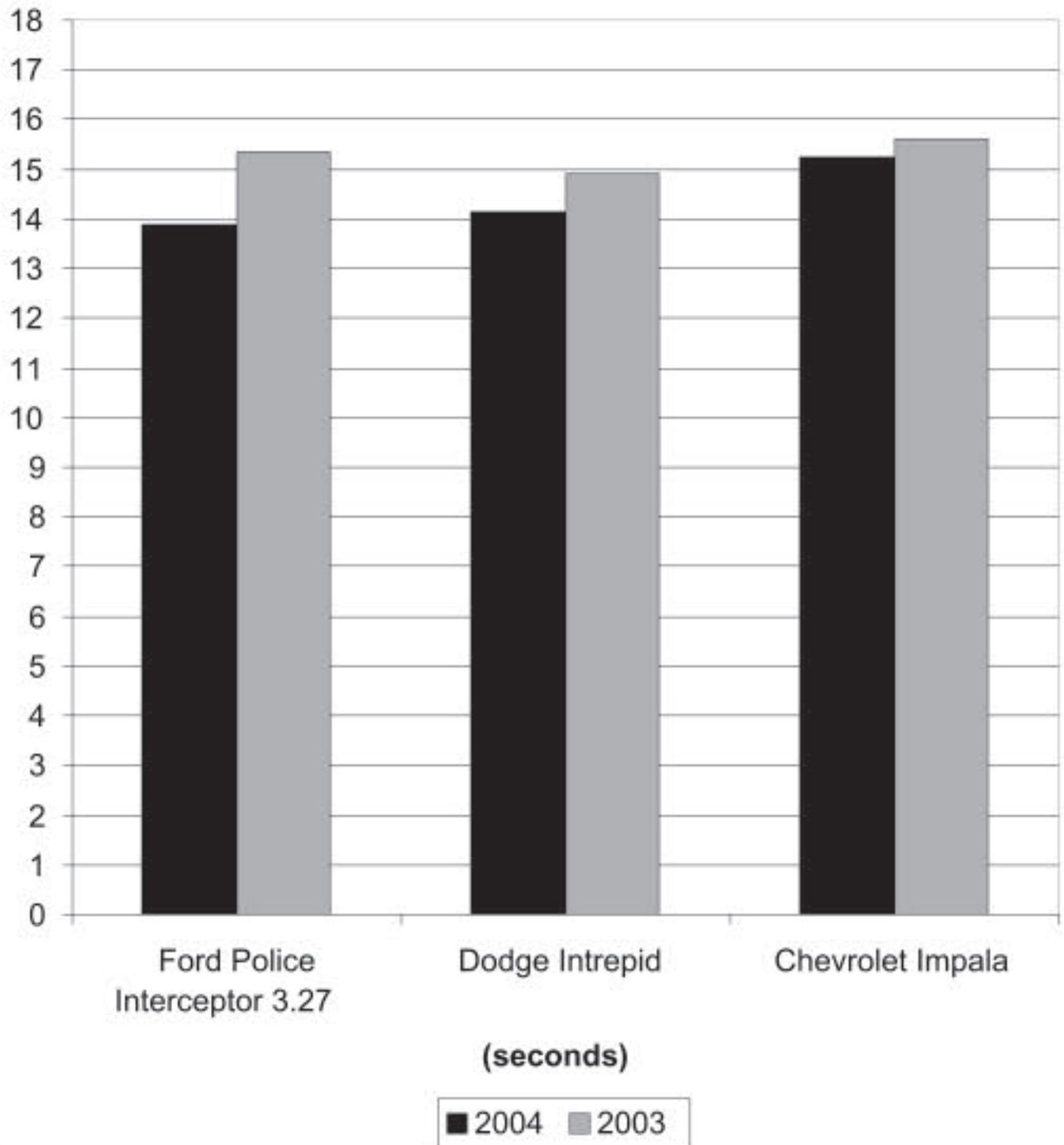
2003-2004 ACCELERATION COMPARISON

0-60 MPH



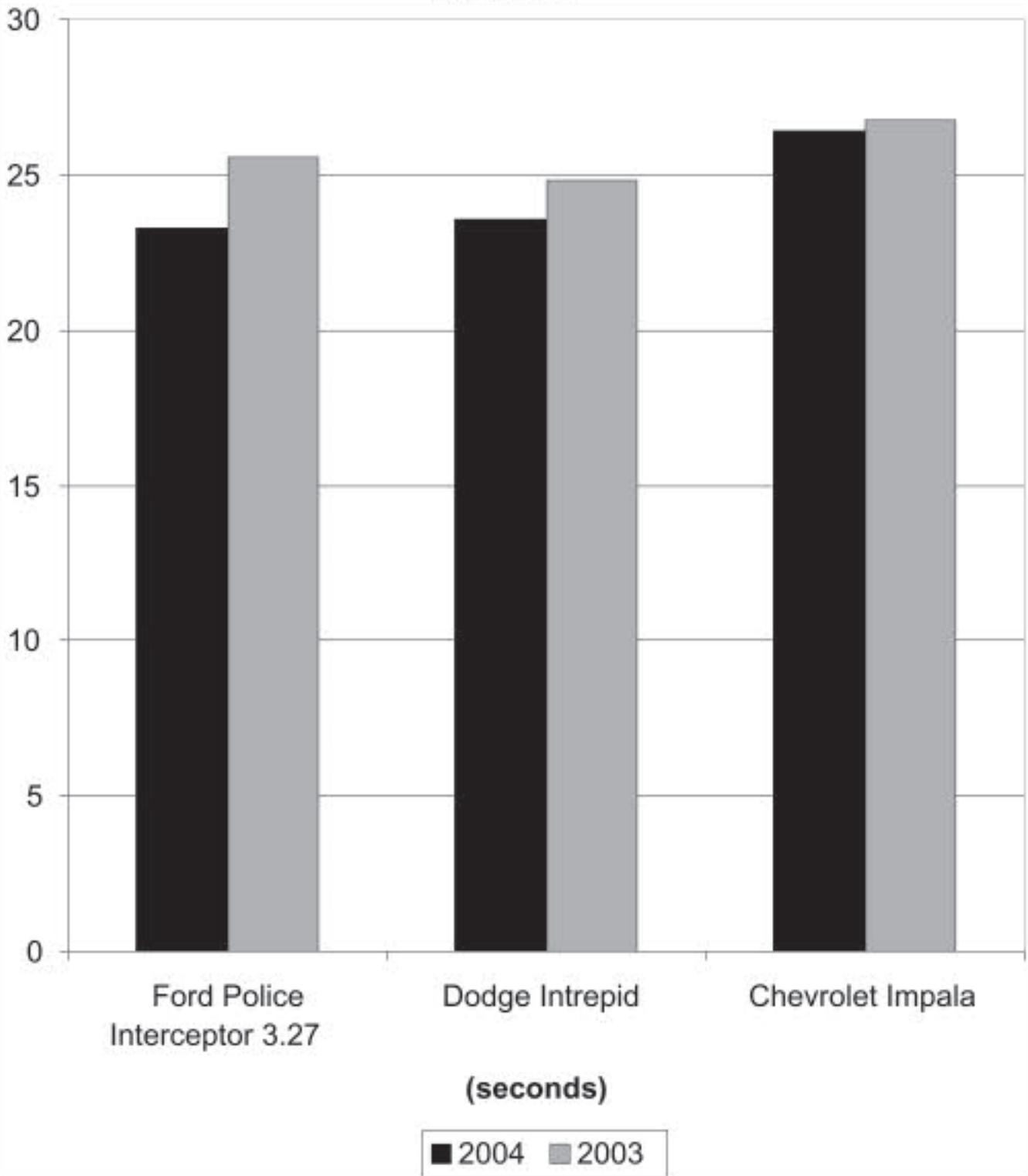
2003-2004 ACCELERATION COMPARISON

0-80 MPH



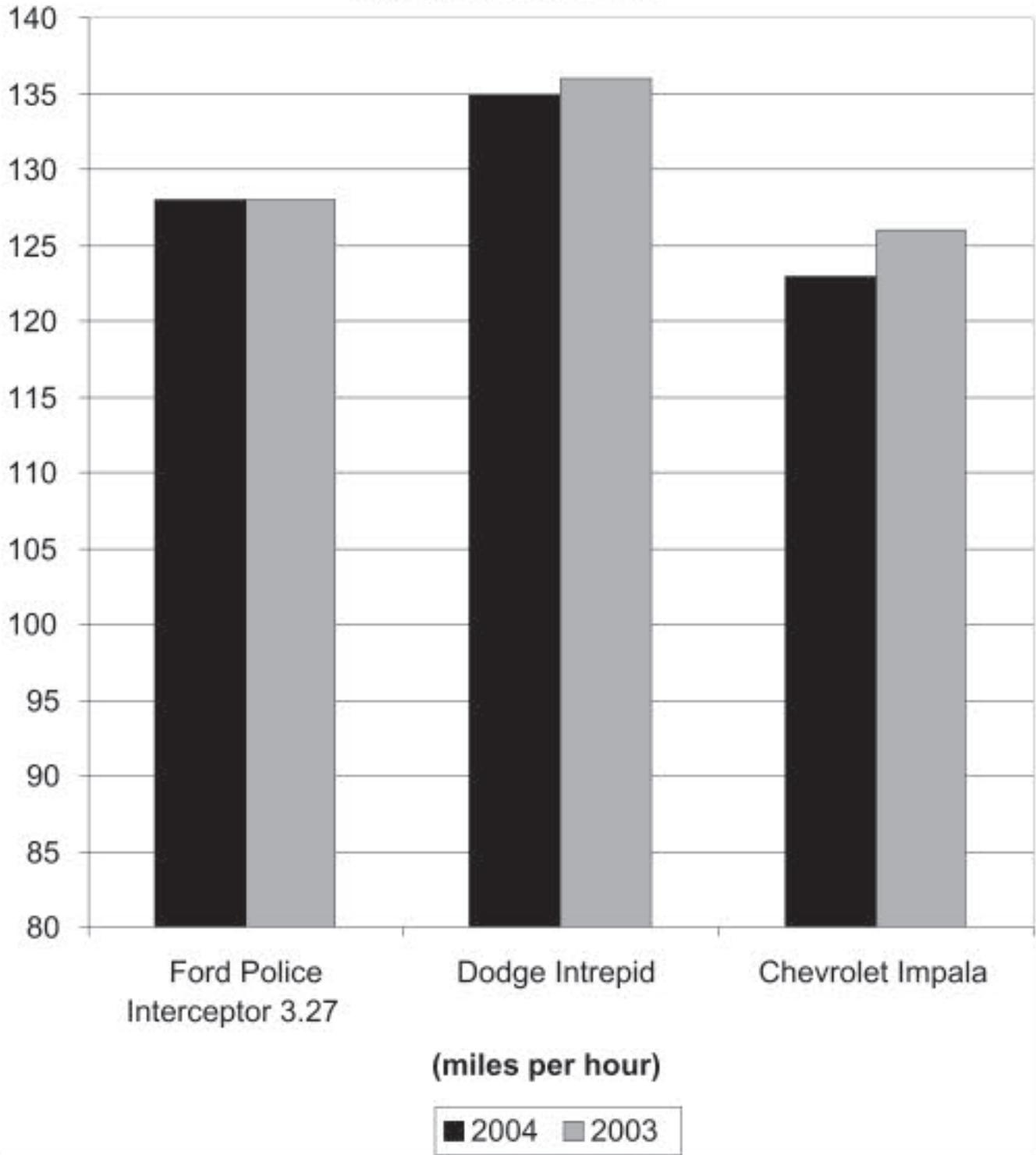
2003-2004 ACCELERATION COMPARISON

0-100 MPH



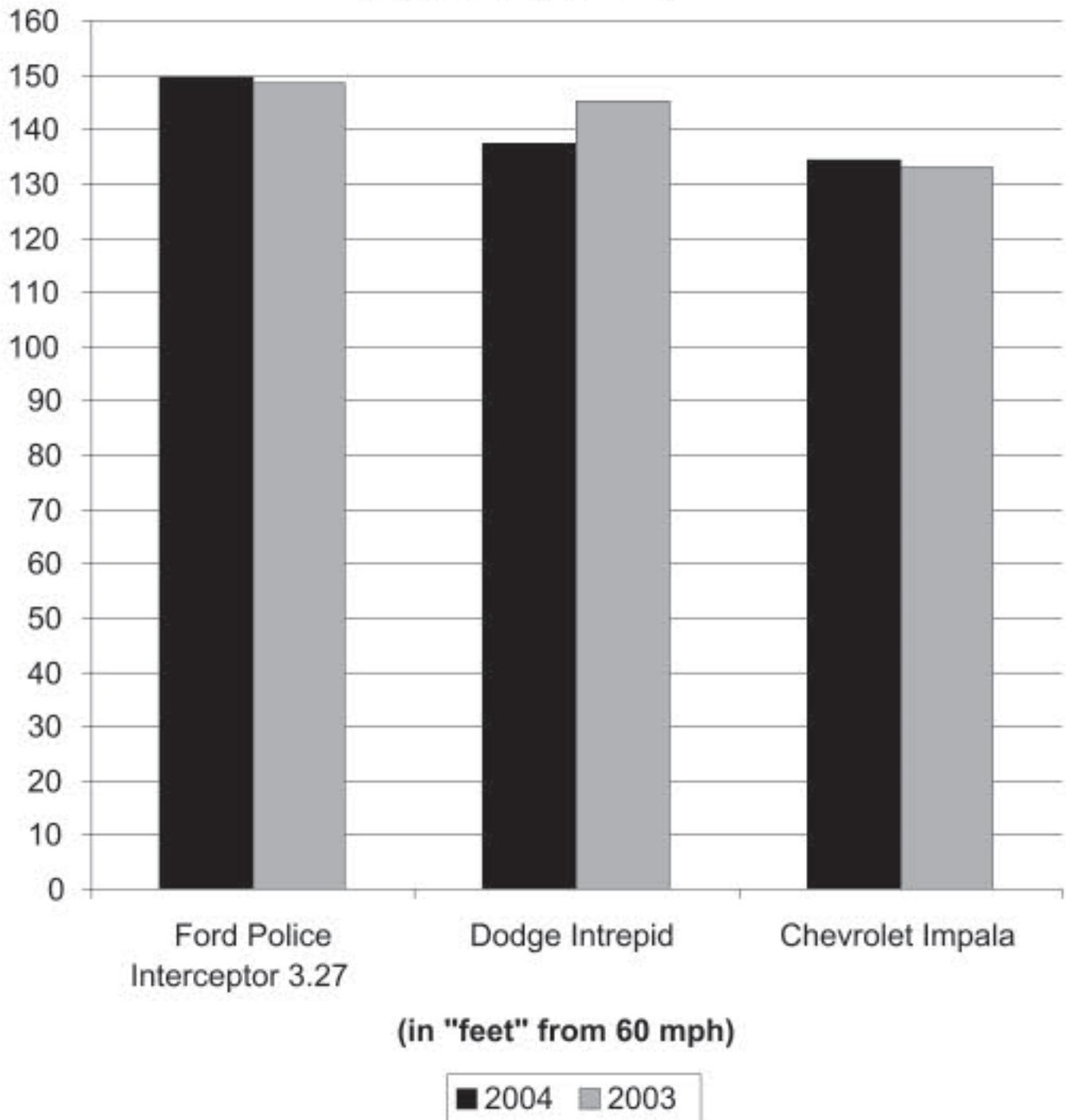
2003-2004 TOP SPEED COMPARISON

TOP SPEED ATTAINED



2003-2004 BRAKE TESTING COMPARISON

STOPPING DISTANCES



SPECIAL SERVICE VEHICLES

The issue of what makes a police vehicle a "police package" is a matter that will be with us for some time. Many law enforcement agencies still require a police vehicle to be capable of participating in high speed emergency and pursuit application, and look to the manufacturers to put their engineering talents towards that goal. At the same time some law enforcement agencies need a vehicle that has cargo capacity and other attributes, but does not require pursuit capabilities. For this, the manufacturers offer "special service" vehicles.

The Michigan Department of State Police presents this information on "special service" vehicles with the caveat that the reader is aware that these vehicles are not engineered for high speed or pursuit driving. The vehicles were tested in all the categories except vehicle dynamics, which is high-speed handling and represents pursuit applications.

The special service vehicles were tested in the following: Acceleration, Top Speed, Braking, Fuel Economy, and Ergonomics & Communications.

SPECIAL SERVICE VEHICLES ARE NOT ENGINEERED FOR HIGH SPEED AND PURSUIT APPLICATIONS.



NOT DESIGNED FOR HIGH SPEED OR PURSUIT DRIVING

**CHEVROLET TAHOE
5.3L SPFI 2WD**



TEST VEHICLE DESCRIPTION

MAKE Chevrolet	MODEL Tahoe 2WD		SALES CODE NO. CC15706	
ENGINE DISPLACEMENT	CUBIC INCHES 327		LITERS 5.3	Note: 4.8L Engine is standard
FUEL SYSTEM	Sequential Port Fuel Injection		EXHAUST	Single
HORSEPOWER (SAENET)	285 @ 5200 RPM		ALTERNATOR	130 amp.
TORQUE	325 ft. lbs. @ 4000 RPM		BATTERY	600 CCA
COMPRESSION RATIO	9.5:1			
TRANSMISSION	MODEL 4L60E	TYPE 4-Speed Automatic Overdrive		
	LOCKUP TORQUE CONVERTER? Yes			
	OVERDRIVE? Yes			
AXLE RATIO	3.42			
STEERING	Power-recirculating ball			
TURNING CIRCLE (CURB TO CURB)	38.3 ft.			
TIRE SIZE, LOAD & SPEED RATING	P245/75/R16 Goodyear Wrangler ST			
SUSPENSION TYPE (FRONT)	Independent, single lower arm with torsion bar			
SUSPENSION TYPE (REAR)	Multi-link with coil springs			
GROUND CLEARANCE, MINIMUM	9.7 in.	LOCATION Front cross member		
	BRAKE SYSTEM Hydro-Boost power anti-lock			
BRAKES, FRONT	TYPE Disc	SWEPT AREA 213 sq. in.		
BRAKES, REAR	TYPE Disc	SWEPT AREA 133 sq. in.		
FUEL CAPACITY	GALLONS 26.0	LITERS 98.4		
GENERAL MEASUREMENTS	WHEELBASE 116 in.	LENGTH 198.9 in.		
	TEST WEIGHT 5046	HEIGHT 76.3 in.		
HEADROOM	FRONT 40.7 in.	REAR 39.4 in.		
LEGROOM	FRONT 41.3 in.	REAR 38.6 in.		
SHOULDER ROOM	FRONT 65.2 in.	REAR 65.1 in.		
HIPROOM	FRONT 61.4 in.	REAR 61.3 in.		
INTERIOR VOLUME *MAX. CARGO IS W/ REAR SEATS FOLDED DOWN	FRONT 94.3 in.	REAR 57.3 in.		
	COMB 151.6 cu. ft.	*MAX. CARGO 108.2 cu. ft.		
EPA MILEAGE EST. (MPG)	CITY 15	HIGHWAY 20	COMBINED 16.5	

**CHEVROLET TAHOE
5.3L SPFI 4WD**



TEST VEHICLE DESCRIPTION

MAKE Chevrolet	MODEL Tahoe 4WD		SALES CODE NO. CK15706	
ENGINE DISPLACEMENT	CUBIC INCHES 327		LITERS 5.3	Note: 4.8L Engine is standard
FUEL SYSTEM	Sequential Port Fuel Injection		EXHAUST	Single
HORSEPOWER (SAENET)	285 @ 5200 RPM		ALTERNATOR	130 amp.
TORQUE	325 ft. lbs. @ 4000 RPM		BATTERY	600 CCA
COMPRESSION RATIO	9.5:1			
TRANSMISSION	MODEL 4L60E	TYPE 4-Speed Automatic Overdrive		
	LOCKUP TORQUE CONVERTER? Yes			
	OVERDRIVE? Yes			
AXLE RATIO	3.73			
STEERING	Speed Sensitive, Power-recirculating ball			
TURNING CIRCLE (CURB TO CURB)	38.3 ft.			
TIRE SIZE, LOAD & SPEED RATING	P245/75/R16 Firestone SteelTek AT			
SUSPENSION TYPE (FRONT)	Independent, single lower arm with torsion bar			
SUSPENSION TYPE (REAR)	Multi-link with coil springs			
GROUND CLEARANCE, MINIMUM	10.7 in.	LOCATION Front differential		
	BRAKE SYSTEM Hydro-Boost power anti-lock			
BRAKES, FRONT	TYPE Disc	SWEPT AREA 213 sq. in.		
BRAKES, REAR	TYPE Disc	SWEPT AREA 133 sq. in.		
FUEL CAPACITY	GALLONS 26.0	LITERS 98.4		
GENERAL MEASUREMENTS	WHEELBASE 116 in.	LENGTH 198.9 in.		
	TEST WEIGHT 5370	HEIGHT 76.3 in.		
HEADROOM	FRONT 40.7 in.	REAR 39.4 in.		
LEGROOM	FRONT 41.3 in.	REAR 38.6 in.		
SHOULDER ROOM	FRONT 65.2 in.	REAR 65.1 in.		
HIPROOM	FRONT 61.4 in.	REAR 61.3 in.		
INTERIOR VOLUME *MAX. CARGO IS W/REAR SEATS FOLDED DOWN	FRONT 94.3 cu. ft.	REAR 57.3 cu. ft.		
	COMB 151.6 cu. ft.	*MAX. CARGO 108.2 cu. ft.		
EPA MILEAGE EST. (MPG)	CITY 14	HIGHWAY 18	COMBINED 16.5	

NOT DESIGNED FOR HIGH SPEED OR PURSUIT DRIVING

FORD EXPLORER 4.6L SFI



TEST VEHICLE DESCRIPTION

MAKE Ford	MODEL Explorer		SALES CODE NO. U63	
ENGINE DISPLACEMENT	CUBIC INCHES 281		LITERS	4.6
FUEL SYSTEM	Sequential Fuel Injection		EXHAUST	Single
HORSEPOWER (SAENET)	239 @ 4750 RPM		ALTERNATOR	130 amp.
TORQUE	282 lb.-ft @ 4000 rpm		BATTERY	650 CCA
COMPRESSION RATIO	9.0:1			
TRANSMISSION	MODEL 5R55W5	TYPE 5-Speed Automatic Overdrive		
	LOCKUP TORQUE CONVERTER? Yes			
	OVERDRIVE? Yes			
AXLE RATIO	3.55			
STEERING	Power Rack & Pinion			
TURNING CIRCLE (CURB TO CURB)	38.8 ft.			
TIRE SIZE, LOAD & SPEED RATING	P235/70R16 Michelin Cross Terrain M&S			
SUSPENSION TYPE (FRONT)	Independent SLA with coil spring			
SUSPENSION TYPE (REAR)	Independent SLA with coil spring			
GROUND CLEARANCE, MINIMUM	8.5 in.	LOCATION Transmission crossmember		
	BRAKE SYSTEM Power w/4-wheel disc, ABS			
BRAKES, FRONT	TYPE Disc	SWEPT AREA 234.60 sq. in.		
BRAKES, REAR	TYPE Disc	SWEPT AREA 170.80 sq. in.		
FUEL CAPACITY	GALLONS 22.5	LITERS	85.1	
GENERAL MEASUREMENTS	WHEELBASE 114.0 in.	LENGTH	189.5 in.	
	TEST WEIGHT 4421	HEIGHT	71.4 in.	
HEADROOM	FRONT 39.9 in.	REAR	38.9 in.	
LEGROOM	FRONT 35.9 in.	REAR	37.2 in.	
SHOULDER ROOM	FRONT 59.1 in.	REAR	58.9 in.	
HIPROOM	FRONT 55.0 in.	REAR	54.2 in.	
INTERIOR VOLUME *MAX. CARGO IS W/REAR SEATS FOLDED DOWN	FRONT 57.7 cu. ft.	REAR	48.7 cu. ft.	
	COMB 106.4 cu. ft.	*MAX. CARGO 79.9 cu. ft.		
EPA MILEAGE EST. (MPG)	CITY 15	HIGHWAY 20	COMBINED 17	

FORD EXPEDITION 5.4L SMPFI



TEST VEHICLE DESCRIPTION

MAKE Ford	MODEL Expedition		SALES CODE NO. U15	
ENGINE DISPLACEMENT	CUBIC INCHES 330		LITERS	5.4
FUEL SYSTEM	Sequential Multiport FI		EXHAUST	Single
HORSEPOWER (SAENET)	260 @ 4500 RPM		ALTERNATOR	110 amp.
TORQUE	350 @ 2500 RPM		BATTERY	650 CCA
COMPRESSION RATIO	9.0:1			
TRANSMISSION	MODEL 4R70W	TYPE 4-Speed Auto Overdrive		
	LOCKUP TORQUE CONVERTER? Yes			
	OVERDRIVE? Yes			
AXLE RATIO	3.73			
STEERING	Variable assist power rack & pinion			
TURNING CIRCLE (CURB TO CURB)	38.7 ft.			
TIRE SIZE, LOAD & SPEED RATING	P265/70R 17 Continental Contitrac SUV			
SUSPENSION TYPE (FRONT)	Double wishbone (SLA) coil-over-shock, gas filled			
SUSPENSION TYPE (REAR)	IRS, double wishbone (SLA) coil-over-shock, gas filled			
GROUND CLEARANCE, MINIMUM	8.9 in.	LOCATION Rear differential		
	BRAKE SYSTEM Power Disc w/4-wheel ABS			
BRAKES, FRONT	TYPE Disc	SWEPT AREA 259.6 sq. in.		
BRAKES, REAR	TYPE Disc	SWEPT AREA 238.1 sq. in.		
FUEL CAPACITY	GALLONS 28.0	LITERS	106.0	
GENERAL MEASUREMENTS	WHEELBASE 119.0	LENGTH	205.8 in.	
	TEST WEIGHT 5444	HEIGHT	77.4 in.	
HEADROOM	FRONT 39.7 in.	REAR	39.8 in.	
LEGROOM	FRONT 41.2 in.	REAR	38.7 in.	
SHOULDER ROOM	FRONT 63.4 in.	REAR	64.3 in.	
HIPROOM	FRONT 63.0 in.	REAR	62.4 in.	
INTERIOR VOLUME *MAX. CARGO IS W/REAR SEATS FOLDED DOWN	FRONT 60.0 cu. ft.	REAR	49.6 cu. ft.	
	COMB 109.6 cu. ft.	*MAX. CARGO 110.5 cu. ft.		
EPA MILEAGE EST. (MPG)	CITY 13	HIGHWAY 17	COMBINED 15	

TEST VEHICLE DESCRIPTION SUMMARY

	Chevrolet 2WD Tahoe	Chevrolet 4WD Tahoe
ENGINE DISPLACEMENT – CU. IN.	327	327
ENGINE DISPLACEMENT – LITERS	5.3*	5.3*
ENGINE FUEL SYSTEM	SPFI	SPFI
HORSEPOWER (SAE NET)	285	285
TORQUE (FT. LBS.)	325	325
COMPRESSION RATIO	9.5:1	9.5:1
AXLE RATIO	3.42	3.73
TURNING CIRCLE – FT. CURB TO CURB	38.3	38.3
TRANSMISSION	4 Speed auto	4 Speed auto
TRANSMISSION MODEL NUMBER	4L60E	4L60E
LOCKUP TORQUE CONVERTER	Yes	Yes
TRANSMISSION OVERDRIVE	Yes	Yes
TIRE SIZE	P245/75R	P245/75R
WHEEL RIM SIZE – INCHES	16	16
GROUND CLEARANCE – INCHES	9.7	10.7
BRAKE SYSTEM	Power, ABS	Power, ABS
BRAKES – FRONT TYPE	Disc	Disc
BRAKES – REAR TYPE	Disc	Disc
FUEL CAPACITY – GALLONS	26	26
FUEL CAPACITY – LITERS	98.4	98.4
OVERALL LENGTH – INCHES	198.9	198.9
OVERALL HEIGHT – INCHES	76.3	76.3
TEST WEIGHT – LBS.	5046	5370
WHEELBASE – INCHES	116	116
HEADROOM FRONT – INCHES	40.7	40.7
HEADROOM REAR – INCHES	39.4	39.4
LEGROOM FRONT – INCHES	41.3	41.3
LEGROOM REAR – INCHES	38.6	38.6
SHOULDER ROOM FRONT – INCHES	65.2	65.2
SHOULDER ROOM REAR – INCHES	65.1	65.1
HIPROOM FRONT – INCHES	61.4	61.4
HIPROOM REAR – INCHES	61.3	61.3
INTERIOR VOLUME FRONT – CU. FT.	94.3	94.3
INTERIOR VOLUME REAR – CU. FT.	57.3	57.3
INTERIOR VOLUME COMB. – CU. FT.	151.6	151.6
REAR MAXIMUM CARGO – CU. FT.	108.2	108.2
EPA MILEAGE – CITY – MPG	15	14
EPA MILEAGE – HIGHWAY – MPG	20	18
EPA MILEAGE – COMBINED – MPG	16.5	16.5

*Vehicle tested with "optional" engine – standard engine is 4.8L, same as 2003 model for performance rating.

TEST VEHICLE DESCRIPTION SUMMARY

	Ford 2WD Explorer	Ford 2WD Expedition
ENGINE DISPLACEMENT – CU. IN.	281	330
ENGINE DISPLACEMENT – LITERS	4.6	5.4
ENGINE FUEL SYSTEM	SPFI	SMPFI
HORSEPOWER (SAE NET)	239	260
TORQUE (FT. LBS.)	282	350
COMPRESSION RATIO	9.0:1	9.0:1
AXLE RATIO	3.55	3.73
TURNING CIRCLE – FT. CURB TO CURB	38.8	38.7
TRANSMISSION	5 Speed Auto	4 Speed auto
TRANSMISSION MODEL NUMBER	5R55W5	4R70W
LOCKUP TORQUE CONVERTER	Yes	Yes
TRANSMISSION OVERDRIVE	Yes	Yes
TIRE SIZE	P235/70R	P265/70R
WHEEL RIM SIZE – INCHES	16	17
GROUND CLEARANCE – INCHES	8.5	8.9
BRAKE SYSTEM	Power, ABS	Power, ABS
BRAKES – FRONT TYPE	Disc	Disc
BRAKES – REAR TYPE	Disc	Disc
FUEL CAPACITY – GALLONS	22.5	28
FUEL CAPACITY – LITERS	85.1	106
OVERALL LENGTH – INCHES	189.5	205.8
OVERALL HEIGHT – INCHES	71.4	77.4
TEST WEIGHT – LBS.	4421	5444
WHEELBASE – INCHES	114	119
HEADROOM FRONT – INCHES	39.9	39.7
HEADROOM REAR – INCHES	38.9	39.8
LEGROOM FRONT – INCHES	35.9	41.2
LEGROOM REAR – INCHES	37.2	38.7
SHOULDER ROOM FRONT – INCHES	59.1	63.4
SHOULDER ROOM REAR – INCHES	58.9	64.3
HIPROOM FRONT – INCHES	55.0	63.0
HIPROOM REAR – INCHES	54.2	62.4
INTERIOR VOLUME FRONT – CU. FT.	57.7	60.0
INTERIOR VOLUME REAR – CU. FT.	48.7	49.6
INTERIOR VOLUME COMB. – CU. FT.	106.4	109.6
REAR MAXIMUM CARGO – CU. FT.	79.9	110.5
EPA MILEAGE – CITY – MPG	15	13
EPA MILEAGE – HIGHWAY – MPG	20	17
EPA MILEAGE – COMBINED – MPG	17	15

SUMMARY OF ACCELERATION AND TOP SPEED

		Chevrolet Tahoe 2WD	Chevrolet Tahoe 4WD	Ford Explorer	Ford Expedition
ACCELERATION*					
0 – 20 mph	(sec.)	1.88	2.02	1.72	1.96
0 – 30 mph	(sec.)	3.13	3.33	2.93	3.40
0 – 40 mph	(sec.)	4.43	4.71	4.41	5.00
0 – 50 mph	(sec.)	6.36	6.76	6.30	7.44
0 – 60 mph	(sec.)	8.58	9.20	8.90	10.11
0 – 70 mph	(sec.)	10.97	11.81	11.79	13.24
0 – 80 mph	(sec.)	14.72	16.00	15.54	17.64
0 – 90 mph	(sec.)	19.50	21.46	21.10	23.67
0 – 100 mph	(sec.)	N/A	N/A	28.25	125.87
TOP SPEED	(mph)	99**	99**	107**	100**
QUARTER MILE					
Time	(sec.)	16.59	17.01	16.77	17.55
Speed	(miles)	83.93	81.85	82.40	79.88

*Four run average

**Vehicle equipped with an electronic speed limiter



BRAKE TESTING

TEST LOCATION: DaimlerChrysler Proving Grounds

DATE: September 20, 2003

BEGINNING Time: 1:33 p.m.

TEMPERATURE: 67.5°F

MAKE & MODEL: Chevrolet Tahoe 2WD 5.3L

BRAKE SYSTEM: Anti-lock

Phase I

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.²)

TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	60.4 mph	141.4 feet	27.75 ft/s ²
Stop #2	60.0 mph	142.7 feet	27.14 ft/s ²
Stop #3	60.1 mph	143.3 feet	27.11 ft/s ²
Stop #4	59.7 mph	143.0 feet	26.81 ft/s ²
Stop #5	60.0 mph	144.0 feet	26.89 ft/s ²
Stop #6	59.7 mph	139.1 feet	27.56 ft/s ²

AVERAGE DECELERATION RATE

27.21 ft/s²

HEAT SOAK (4 minutes)

Phase II

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.²)

TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	59.2 mph	138.8 feet	27.16 ft/s ²
Stop #2	59.5 mph	142.4 feet	26.74 ft/s ²
Stop #3	59.2 mph	138.9 feet	27.14 ft/s ²
Stop #4	59.6 mph	138.8 feet	27.53 ft/s ²
Stop #5	59.1 mph	137.6 feet	27.30 ft/s ²
Stop #6	59.5 mph	140.3 feet	27.14 ft/s ²

AVERAGE DECELERATION RATE

27.17 ft/s²

Phase III

	Yes/No
Evidence of severe fading?	<u>No</u>
Vehicle stopped in straight line?	<u>Yes</u>
Vehicle stopped within correct lane?	<u>Yes</u>

OVERALL AVERAGE DECEL. RATE:

27.19 ft/s²

Projected Stopping Distance from 60.0 mph **142.4**

BRAKE TESTING

TEST LOCATION: DaimlerChrysler Proving Grounds

DATE: September 20, 2003

BEGINNING Time: 10:38 a.m.

TEMPERATURE: 61.6°F

MAKE & MODEL: Chevrolet Tahoe 4WD 5.3L

BRAKE SYSTEM: Anti-lock

Phase I

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.²)

TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	59.5 mph	144.2 feet	26.41 ft/s ²
Stop #2	59.7 mph	146.8 feet	26.11 ft/s ²
Stop #3	60.3 mph	142.2 feet	27.50 ft/s ²
Stop #4	60.3 mph	148.5 feet	26.34 ft/s ²
Stop #5	60.2 mph	151.6 feet	25.71 ft/s ²
Stop #6	60.4 mph	145.1 feet	27.04 ft/s ²

AVERAGE DECELERATION RATE **26.52 ft/s²**

HEAT SOAK (4 minutes)

Phase II

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.²)

TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	59.9 mph	141.6 feet	27.25 ft/s ²
Stop #2	60.1 mph	146.5 feet	26.52 ft/s ²
Stop #3	59.8 mph	143.2 feet	26.86 ft/s ²
Stop #4	59.5 mph	143.3 feet	26.57 ft/s ²
Stop #5	60.3 mph	148.3 feet	26.37 ft/s ²
Stop #6	59.7 mph	144.3 feet	26.57 ft/s ²

AVERAGE DECELERATION RATE **26.69 ft/s²**

Phase III

	Yes/No
Evidence of severe fading?	<u>No</u>
Vehicle stopped in straight line?	<u>Yes</u>
Vehicle stopped within correct lane?	<u>Yes</u>

OVERALL AVERAGE DECEL. RATE: **26.61 ft/s²**

Projected Stopping Distance from 60.0 mph **145.5**

BRAKE TESTING

TEST LOCATION: DaimlerChrysler Proving Grounds

DATE: September 20, 2003

BEGINNING Time: 11:13 a.m.

TEMPERATURE: 63.1°F

MAKE & MODEL: Ford Explorer 4.6L

BRAKE SYSTEM: Anti-lock

Phase I

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.²)

TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	61.1 mph	144.0 feet	27.89 ft/s ²
Stop #2	59.5 mph	141.8 feet	26.85 ft/s ²
Stop #3	60.2 mph	144.8 feet	26.92 ft/s ²
Stop #4	60.0 mph	142.3 feet	27.21 ft/s ²
Stop #5	60.0 mph	141.7 feet	27.33 ft/s ²
Stop #6	60.8 mph	144.2 feet	27.57 ft/s ²

AVERAGE DECELERATION RATE **27.30 ft/s²**

HEAT SOAK (4 minutes)

Phase II

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.²)

TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	59.5 mph	140.4 feet	27.12 ft/s ²
Stop #2	59.9 mph	143.5 feet	26.89 ft/s ²
Stop #3	60.6 mph	145.8 feet	27.09 ft/s ²
Stop #4	60.3 mph	139.4 feet	28.06 ft/s ²
Stop #5	60.0 mph	141.5 feet	27.37 ft/s ²
Stop #6	60.4 mph	143.7 feet	27.31 ft/s ²

AVERAGE DECELERATION RATE **27.31 ft/s²**

Phase III

	Yes/No
Evidence of severe fading?	<u>No</u>
Vehicle stopped in straight line?	<u>Yes</u>
Vehicle stopped within correct lane?	<u>Yes</u>

OVERALL AVERAGE DECEL. RATE: **27.30 ft/s²**

Projected Stopping Distance from 60.0 mph **141.8**

BRAKE TESTING

TEST LOCATION: DaimlerChrysler Proving Grounds

DATE: September 20, 2003

BEGINNING Time: 1:58 p.m.

TEMPERATURE: 67.5°F

MAKE & MODEL: Ford Expedition 5.4L

BRAKE SYSTEM: Anti-lock

Phase I

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.²)

TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	59.7 mph	140.7 feet	27.25 ft/s ²
Stop #2	60.4 mph	144.4 feet	27.17 ft/s ²
Stop #3	60.1 mph	142.8 feet	27.21 ft/s ²
Stop #4	60.6 mph	147.2 feet	26.83 ft/s ²
Stop #5	60.2 mph	147.2 feet	26.48 ft/s ²
Stop #6	59.6 mph	137.9 feet	27.71 ft/s ²

AVERAGE DECELERATION RATE **27.11 ft/s²**

HEAT SOAK (4 minutes)

Phase II

BRAKE HEAT-UP: (Two 90 –0 mph decelerations @ 22 ft.sec.²)

TEST: (Six 60 – mph impending skid (ABS) maximum deceleration rate stops)

	Initial Velocity	Stopping Distance	Deceleration Rate
Stop #1	60.1 mph	143.4 feet	27.09 ft/s ²
Stop #2	59.8 mph	141.6 feet	27.16 ft/s ²
Stop #3	59.3 mph	137.5 feet	27.51 ft/s ²
Stop #4	59.5 mph	143.2 feet	26.59 ft/s ²
Stop #5	60.2 mph	145.2 feet	26.85 ft/s ²
Stop #6	59.6 mph	140.4 feet	27.21 ft/s ²

AVERAGE DECELERATION RATE **27.07 ft/s²**

Phase III

	Yes/No
Evidence of severe fading?	<u>No</u>
Vehicle stopped in straight line?	<u>Yes</u>
Vehicle stopped within correct lane?	<u>Yes</u>

OVERALL AVERAGE DECEL. RATE: **27.09 ft/s²**

Projected Stopping Distance from 60.0 mph **142.9**

ERGONOMICS AND COMMUNICATIONS

ERGONOMICS	Chevrolet Tahoe 2WD	Chevrolet Tahoe 4WD	Ford Explorer	Ford Expedition
FRONT SEAT				
Padding	8.20	8.20	6.90	7.80
Depth of Bucket Seat	8.00	8.00	6.80	7.60
Adjustability – Front to Rear	7.50	7.50	6.10	7.80
Upholstery	7.90	7.90	6.90	7.80
Bucket Seat Design	8.10	8.10	6.30	7.30
Headroom	9.20	9.20	8.40	9.10
Seatbelts	6.60	6.60	7.00	7.90
Ease of Entry and Exit	7.60	7.60	7.30	7.40
Overall Comfort Rating	8.40	8.40	6.67	8.20
REAR SEAT				
Leg room – Front seat back	7.30	7.30	5.80	8.30
Ease of Entry and Exit	6.40	6.40	5.70	6.70
INSTRUMENTATION				
Clarity	8.30	8.30	6.90	7.00
Placement	7.90	7.90	6.70	6.70
VEHICLE CONTROLS				
Pedals, Size and Position	8.30	8.30	7.40	8.20
Power Window Switch	7.80	7.80	7.30	7.50
Inside Door Lock Switch	7.30	7.30	5.70	7.30
Automatic Door Lock Switch	7.70	7.70	7.10	7.50
Outside Mirror Controls	7.90	7.90	5.50	6.78
Steering Wheel, Size, Tilt Release, and Surface	8.40	8.40	6.30	6.40
Heat/AC Vent Placement and Adjustability	8.10	8.10	7.00	6.80
VISIBILITY				
Front (Windshield)	8.40	8.40	7.60	8.60
Rear (Back Window)	6.80	6.80	6.00	6.80
Left Rear Quarter	6.40	6.40	6.33	6.60
Right Rear Quarter	6.90	6.90	6.90	7.80
Outside Rear View Mirrors	8.00	8.00	5.70	9.10
COMMUNICATIONS				
Dashboard Accessibility	8.00	8.00	7.00	7.00
Trunk Accessibility	8.00	8.00	8.00	8.00
Engine Compartment	8.00	8.00	7.00	7.00
TOTAL SCORES	217.40	217.40	188.30	210.98

About the National Institute of Justice

NIJ is the research, development, and evaluation agency of the U.S. Department of Justice. The Institute provides objective, independent, evidence-based knowledge and tools to enhance the administration of justice and public safety. NIJ's principal authorities are derived from the Omnibus Crime Control and Safe Streets Act of 1968, as amended (see 42 USC §§ 3721–3723).

The NIJ Director is appointed by the President and confirmed by the Senate. The Director establishes the Institute's objectives, guided by the priorities of the Office of Justice Programs, the U.S. Department of Justice, and the needs of the field. The Institute actively solicits the views of criminal justice and other professionals and researchers to inform its search for the knowledge and tools to guide policy and practice.

Strategic Goals

NIJ has seven strategic goals grouped into three categories:

Creating relevant knowledge and tools

1. Partner with State and local practitioners and policymakers to identify social science research and technology needs.
2. Create scientific, relevant, and reliable knowledge—with a particular emphasis on terrorism, violent crime, drugs and crime, cost-effectiveness, and community-based efforts—to enhance the administration of justice and public safety.
3. Develop affordable and effective tools and technologies to enhance the administration of justice and public safety.

Dissemination

4. Disseminate relevant knowledge and information to practitioners and policymakers in an understandable, timely, and concise manner.
5. Act as an honest broker to identify the information, tools, and technologies that respond to the needs of stakeholders.

Agency management

6. Practice fairness and openness in the research and development process.
7. Ensure professionalism, excellence, accountability, cost-effectiveness, and integrity in the management and conduct of NIJ activities and programs.

Program Areas

In addressing these strategic challenges, the Institute is involved in the following program areas: crime control and prevention, including policing; drugs and crime; justice systems and offender behavior, including corrections; violence and victimization; communications and information technologies; critical incident response; investigative and forensic sciences, including DNA; less-than-lethal technologies; officer protection; education and training technologies; testing and standards; technology assistance to law enforcement and corrections agencies; field testing of promising programs; and international crime control.

In addition to sponsoring research and development and technology assistance, NIJ evaluates programs, policies, and technologies. NIJ communicates its research and evaluation findings through conferences and print and electronic media.

About the Law Enforcement and Corrections Standards and Testing Program

The Law Enforcement and Corrections Standards and Testing Program is sponsored by the Office of Science and Technology of the National Institute of Justice (NIJ), U.S. Department of Justice. The program responds to the mandate of the Justice System Improvement Act of 1979, which directed NIJ to encourage research and development to improve the criminal justice system and to disseminate the results to Federal, State, and local agencies.

The Law Enforcement and Corrections Standards and Testing Program is an applied research effort that determines the technological needs of justice system agencies, sets minimum performance standards for specific devices, tests commercially available equipment against those standards, and disseminates the standards and the test results to criminal justice agencies nationwide and internationally.

The program operates through the following:

- The **Law Enforcement and Corrections Technology Advisory Council (LECTAC)**, consisting of nationally recognized criminal justice practitioners from Federal, State, and local agencies, assesses technological needs and sets priorities for research programs and items to be evaluated and tested.
- The **Office of Law Enforcement Standards (OLES)** at the National Institute of Standards and Technology develops voluntary national performance standards for compliance testing to ensure that individual items of equipment are suitable for use by criminal justice agencies. The equipment standards developed by OLES are based on laboratory evaluation of commercially available products in order to devise precise test methods that can be universally applied by any qualified testing laboratory and to establish minimum performance requirements for each attribute of a piece of equipment that is essential to how it functions. OLES-developed standards can serve as design criteria for manufacturers or as the basis for equipment evaluation. The application of the standards, which are highly technical in nature, is augmented through the publication of equipment performance reports and user guides. Individual jurisdictions may use the standards in their own laboratories to test equipment, have equipment tested on their behalf using the standards, or cite the standards in procurement specifications.

• The **National Law Enforcement and Corrections Technology Center (NLECTC)**, operated by a grantee, supervises a national compliance testing program conducted by independent laboratories. The standards developed by OLES serve as performance benchmarks against which commercial equipment is measured. The facilities, personnel, and testing capabilities of the independent laboratories are evaluated by OLES prior to testing each item of equipment. In addition, OLES helps NLECTC staff review and analyze data. Test results are published in consumer product reports designed to help justice system procurement officials make informed purchasing decisions.

Publications are available at no charge through NLECTC. Some documents are also available online through the Justice Technology Information Network (JUSTNET), the center's Internet/World Wide Web site. To request a document or additional information, call 800-248-2742 or 301-519-5060, or write:

National Law Enforcement and Corrections Technology Center

2277 Research Boulevard

Mail Stop 8J

Rockville, MD 20850

E-mail: asknlectc@nlectc.org

World Wide Web address: <http://www.justnet.org>

About the National Law Enforcement and Corrections Technology Center System

The National Law Enforcement and Corrections Technology Center (NLECTC) system exists to support the Nation's structure of State and local law enforcement and corrections. The United States has more than 18,000 law enforcement agencies, 50 State correctional systems, and thousands of prisons and jails. The fragmented nature of law enforcement and corrections impedes the dissemination of valuable new information, fosters a patchwork marketplace that discourages the commercialization of new technologies, and underscores the need for uniform performance standards for equipment and technologies.

The National Institute of Justice's (NIJ's) Office of Science and Technology (OS&T) created NLECTC in 1994 as a national system of technology centers that are clearinghouses of information and sources of technology assistance and that also attend to special needs, including technology commercialization and standards development.

The NLECTC system's purpose is to determine the needs of the law enforcement and corrections communities and assist them in understanding, using, and benefitting from new and existing technologies that, increasingly, are vital levers of progress in criminal justice. NIJ/OS&T and the NLECTC system are the only current programs developed by the Federal Government that focus solely on the development and transfer of technologies to State and local law enforcement and corrections.

NLECTC is a program of NIJ, the research and development arm of the U.S. Department of Justice. The system currently consists of a national center, five regional centers, and several speciality offices. Also contributing to the initiatives of the center system is the Office of Law Enforcement Standards. The centers are co-located with a host organization or agency that specializes in one or more areas of technology research and development.

The National Center, located in Rockville, Maryland, is the system's information hub. Regional centers are currently located in Alaska, California, Colorado, New York, and South Carolina. Speciality centers located around the country deal with border matters (California), commercialization of law enforcement and corrections technologies (West Virginia), rural law enforcement issues (Kentucky), and standards and testing (Maryland).

Each center shares roles with the other centers and has distinctive characteristics. All are focused on helping law enforcement and corrections take full advantage of technology's rapidly growing capacity to serve the purposes of crime control and the criminal justice system.

A national body of criminal justice professionals, the Law Enforcement and Corrections Technology Advisory Council (LECTAC), helps identify research and development priorities, thereby influencing the work of the NLECTC system. In addition, each NLECTC center has a regional advisory council of law enforcement and corrections officials. Together, LECTAC and the advisory councils help to keep the NLECTC system attentive to technological priorities and the needs of law enforcement and corrections. They help to link the end user with the developer to create technologies that adequately meet operational requirements and establish which potential technologies should be pursued for development.

All of the current regional centers have distinctive roles or focus areas, that, in many cases, are aligned with the expertise of host organizations and agencies. The centers are currently operated under cooperative agreements or interagency agreements with host organizations and agencies whose employees staff the centers.

To receive more information or to add your name to the NLECTC mailing list, call 800-248-2742 or 301-519-5060, or write:

National Law Enforcement and Corrections Technology Center

2277 Research Boulevard
Mail Stop 8J
Rockville, MD 20850
E-mail: asknlectc@nlectc.org
World Wide Web address: <http://www.justnet.org>

The following is a list of NLECTC regional and affiliated facilities that assist NIJ in fulfilling its mission.

NLECTC–Northeast

26 Electronic Parkway
Rome, NY 13441-4514
(p) 888-338-0584
(f) 315-330-4315
E-mail: nlectc_ne@rl.af.mil

NLECTC–Southeast

5300 International Boulevard
North Charleston, SC 29418
(p) 800-292-4385
(f) 843-760-4611
E-mail: nlectc-se@nlectc-se.org

NLECTC–Rocky Mountain

2050 East Iliff Avenue
Denver, CO 80208
(p) 800-416-8086
(f) 303-871-2500
E-mail: nlectc@du.edu

NLECTC–West

c/o The Aerospace Corporation
2350 East El Segundo Boulevard
El Segundo, CA 90245-4691
(p) 888-548-1618
(f) 310-336-2227
E-mail: nlectc@law-west.org

NLECTC–Northwest

3000 C Street
Suite 304
Anchorage, AK 99503–3975
(p) 866–569–2969
(f) 907–569–6939
E-mail: nlectc_nw@ctsc.net

Border Research and Technology Center

1010 Second Avenue
Suite 1920
San Diego, CA 92101–4912
(p) 888–656–2782
(f) 888–660–2782
E-mail: info@brtc.nlectc.org

Rural Law Enforcement Technology Center

101 Bulldog Lane
Hazard, KY 41701
(p) 866–787–2553
(f) 606–436–6758
E-mail: ruletc@aol.com

Office of Law Enforcement Technology Commercialization

2001 Main Street
Suite 500
Wheeling, WV 26003
(p) 888–306–5382
(f) 304–230–2310
E-mail: oletc@oletc.org

Office of Law Enforcement Standards

100 Bureau Drive
Stop 8102
Gaithersburg, MD 20899–8102
(p) 301–975–2757
(f) 301–948–0978
E-mail: oles@nist.gov

About the Office of Law Enforcement Standards

The Office of Law Enforcement Standards (OLES) was established as a matrix management organization in 1971 through a Memorandum of Understanding between the U.S. Departments of Justice and Commerce based on the recommendations of the President's Commission on Crime. OLES's mission is to apply science and technology to the needs of the criminal justice community, including law enforcement, corrections, forensic science, and the fire service. While its major objective is to develop minimum performance standards, which are promulgated as voluntary national standards, OLES also undertakes studies leading to the publication of technical reports and user guides.

The areas of research investigated by OLES include clothing, communication systems, emergency equipment, investigative aids, protective equipment, security systems, vehicles, weapons, and analytical techniques and standard reference materials used by the forensic science community. The composition of OLES's projects varies depending on priorities of the criminal justice community at any given time and, as necessary, draws on the resources of the National Institute of Standards and Technology.

OLES assists law enforcement and criminal justice agencies in acquiring, on a cost-effective basis, the high-quality resources they need to do their jobs. To accomplish this, OLES:

- Develops methods for testing equipment performance and examining evidentiary materials.
- Develops standards for equipment and operating procedures.
- Develops standard reference materials.
- Performs other scientific and engineering research as required.

Since the program began in 1971, OLES has coordinated the development of nearly 200 standards, user guides, and advisory reports. Topics range from performance parameters of police patrol vehicles, to performance reports on various speed-measuring devices, to soft body armor testing, to analytical procedures for developing DNA profiles.

The application of technology to enhance the efficiency and effectiveness of the criminal justice community continues to increase. The proper adoption of the products resulting from emerging technologies and the assessment of equipment performance, systems, methodologies, etc., used by criminal justice practitioners constitute critical issues having safety and legal ramifications. The consequences of inadequate equipment performance or inadequate test methods can range from inconvenient to catastrophic. In addition, these deficiencies can adversely affect the general population when they increase public safety costs, preclude arrest, or result in evidence found to be inadmissible in court.

NATIONAL LAW ENFORCEMENT AND CORRECTIONS TECHNOLOGY CENTER
2277 RESEARCH BOULEVARD
MAIL STOP 8J
ROCKVILLE, MD 20850

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